

E-Science Indonesia: Innovation, Integration, and Utilization

Explanatory Study members in Central Java: Muria Kudus University, Islamic University of Nahdlatul Ulama Jepara, and Institute of Health Science PKU Muhammadiyah Solo

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Abstract—This study discusses E-science Indonesia One Search related to integration, innovation, and utilization for its users. Indonesia One Search is one of the open scientific databases that contains various works of both books and research reports from various universities and the community. The method used in this research was qualitative descriptive, using a non-probability sampling technique with a model of purposive sampling. The results of the study showed that Indonesia One Search is a database of scientific information with diverse institutional contributors in Indonesia. The portal develops innovation by integrating multiple web address libraries, facilitating the searching of information in a single web address, providing variations of the information retrieval process, broadening the collection access, widening knowledge, and building scientific communication between researchers who are unlimited by space and time.

Keywords—open access, innovation repository, Indonesia One Search

I. INTRODUCTION

The library is one of the learning and education sources along life of the community. In the past, the library was built in a magnificent building and had a lot of collections of books and we can still visit such library up to now. The library is one of the places to learn and look for a variety information we need. The library is also the place of education for all ages; in the library, everyone can be together though they have the various educational backgrounds. One of the library roles is as an informal and non-formal educational function. It means that library is the place for studying in school as well as outside the school. Someone can still grab the latest knowledge if he/she visits the library and reads differing collections there.

Ismail Fahmi [1], a consultant and initiator, in his writings about Indonesia One Search stated that based on the data from National Library of the Republic of Indonesia in 2016, Indonesia has thousands of libraries. The details in Table 1.

Meanwhile, the data retrieved from the Ministry of Research, Technology and Higher Education (2016) showed

TABLE I. TOTAL LIBRARY IN INDONESIA

No	Type of Library	Total
1	School library	61,621
2	Public Library	2,354
3	Special Library	1,186
4	Higher Education Library	1,106

that the total of college units registered is 4,312 units. It is dominated by private higher education which were 3,940 units and state higher education which were 372 units. Both of these data indicate that there are a lot of sources for learning both from the book and the other scientific works stored in their libraries.

Along with the development of information technology, library develops Technology-based services such as the OPAC web, library repository, e-resources and various scientific databases. However, the users may face problems since all libraries develop their own technology and they are not connected in a single national data integration. For example, in the college environment, of course, there are a lot of research results funded by state institutions, private institutions, and private costs; however, the research results cannot be enjoyed by the community or the other researchers. It is because those various important research results are stored in each institution library and thus it raises the problem of uneasy access; for example, with digital library web address they own. Putu Laxman Pendit [2] argued “the problem of each system that often has different performance and the network that connects the various systems are also not necessarily reliable, and visitors are interested in searching. In other words, the different computer system must be able to exchange data in a real time.

National Library of the Republic of Indonesia pioneered the movement for the management of a scientific paper database in a repository named Indonesia One Search. This portal is an innovation of the nation that contains a collection of bibliography and repository (full text) owned by all institutions both special and public libraries and universities and the other information institutions. This portal allows the

community to find various scientific papers for the benefit of education and research in an integrated way.

II. METHOD

This research is more open, creative and flexible; therefore, all information sources have important values. Thereby, this research will make this topic is increasingly known by the society and enable the advanced research from concept or topic covered. Meanwhile, the techniques and directions of the advanced research will be determined. The qualitative method was employed in this study. This study used an inductive approach in which this approach firstly observed the situation or circumstances in the field and made conclusions based on the field information. Especially this study used the explorative method with an inductive approach to examine (1) what is the background of innovation in E-Science Indonesia? (2) How is the implementation of scientific open access integration of the partner repository in IOS? And (3) what are the benefits of this portal for the education partner institutions?

A. Type of Data Source

HB Sutopo [3] stated that the type of data source includes respondent, event or activity, the place or locations, objects (various pictures and records, as well as document and archive). The types of data sources in this study are (1) Portal Indonesia One Search (2) Mr. Ismail Fahmi [1], one of the innovators and consultant in Indonesia One Search (3) Mr. Joko Santoso from National Library of Indonesia (4) Partners of Library Institutions (in Central Java) in the iOS network namely Muria Kudus University, Islamic University of Nahdlatul Ulama Jepara, and Institute of Health Science PKU Muhammadiyah Solo.

B. Data analysis

Miles & Huberman [4] state that in the process of qualitative analysis there are several activities, namely: 1) Data Collection: in this study, the data were gathered from web portals and one of the initiators of IOS 2) Data Presentation: the collected data collected were expected to be the new findings (3) Data Reduction: this stage is conducted to adjust the data/information obtained in the field. 4). Making conclusion: if the data are sufficient, it can be deduced as an input as well as a proposal for IOS portal.

III. RESULTS AND DISCUSSION

A. *Indonesia One Search: oneshow.id*

In this section, the author would like to provide a several comparisons related to the management of scientific work as a learning resource developed in digital networks and within the national network. A study by [5] "E-science and open access repositories in Spain" published in OCLC Systems & Services: International digital library perspectives, Vol. 23 Issue: 4, pp.363-371, also discusses the digital knowledge network and repository in Spain. The paper states that e-science is a collection of scientific activities conducted by utilizing the Internet resources in the distribution and access.

This case is aiming at strengthening the interaction between researchers by mutually utilizing technologies collaboration. E-science is a revolutionary innovation in support of learning and research activities of the researchers. In this network, interdisciplinary scientists publish their useful works for the study of the other subjects. This portal is also a result of government coordination in collecting various scientific databases that in a year to reach 30,000 titles of scientific works in Spain.

The innovation of Indonesia One Search is designed to be a search portal that can integrate various existing repositories. Therefore, it can realize the integration of knowledge spread across the various repositories. Its data integration mechanism uses the OAI-PMH protocol of Open Archive Initiatives - Protocol for Metadata Harvesting. This protocol allows the portal server to download all the metadata stored in the repository on member servers.

TABLE II. FORMAT OF IOS COLLECTION

Books	2,549,817
Others	960,439
Journal	730,589
theses	605,998
Peer review	545,772
files	428,991
maps	50,890
reports	44,424
documents	30,680
images	26,401
sounds	24,241
work of art	3,195
videos	1,418

TABLE III. SECTOR

Libraries	3,841,136
Universities	2,313,833
Public	603,115
Specials	162,563
Schools	58,056

TABLE IV. STAKEHOLDER

Institutions	597
Libraries	673
Repositories	3,696

B. Empowering Discovery and Innovation

Ismail Fahmi [1], one of the consultants and initiator of IOS, states that some innovations in Indonesia OneSearch are:

1) Multi Contents

IOS digital sources with the catalog collections of books, e-books, final projects, theses, dissertations, research reports, legal reports, multimedia (audio, image, video), etc.

2) Multi Sectors

Indonesia One Search is designed for not only the library sector but also the other sectors that will be integrated in the future, such as archives and museum sectors.

3) Multi-Platforms Interoperability

Libraries in Indonesia are welcomed to join in Indonesia One Search since with the protocol OAI-PMH (Open Archive Initiatives - Protocol for metadata harvesting), the digital library system simply provides access to metadata of each library.

4) One Search Form for All

To search for records from multiple sources in different formats, the users simply use one search form, through a browser on their computer or mobile device. Through this one-stop, they can access all the sources of science that have been indexed by Indonesia One Search.

5) E-resources integration

E-resources are digital collections subscribed by the National Library or an international publisher's edition, which usually contains electronic journals, databases, and e-books. To access E-resources subscribed by the National Library, the users do not need to switch applications, because from the same search form in Indonesia One Search, they can access those E-resources.

6) Search Widget

The institution or library that has become the member may install the search widget of Indonesia One Search into their sites. Therefore, Indonesia One Search services will be available and closer to their users.

7) Full-text Search

In addition to indexing metadata, the IOS system is also capable of indexing full-text documents from digital repository collections through open access.

8) Knowledge Explorer

In this menu, the users will find it easy to search various entities such as person, organization, location, activity, and time. They can know the relationships between entities with each other, view patterns of co-occurrence, trends, and various other analyses through this Knowledge Explorer.

C. Benefits

Blanca Rodri'guez Bravo and Ma Luisa AlviteDi'ez [5] suggest that the latest model to communicate the benefits of various research results from various universities is to use a shared network between libraries. In this case, it can also reduce the dependence with international journal publishers and its high price tag. Another benefit written in this research report is that the presence of the repository of scientific papers or research results will distribute various scientific works from various institutions to the community. Ismail Fahmi [1] provides several things related to the benefits of Indonesia One Search. The benefits for users (1) Saving time to search (2) Avoiding plagiarism (3) Exploring ideas

The benefits for institutions:

- Increasing access volume

By joining IOS, the existing collections of each institution will be accessible for IOS users everywhere.

- Mapping the institution knowledge

By joining IOS, the subject of various knowledge resulted from scientific works in every institution will be known and interconnected with various studies conducted within both institutions and their relationship with various subjects in the other institutions.

1) Powerful Search Engine

Indonesian One Search portal users are equipped with various search strategies, especially digital information in the 21st century. The users need to know various information search strategies to make the search results relevant to the information needs.

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These search strategies include:

3) Wildcard Searches

This search tool software is called wildcard character i.e. a kind of placeholder represented by a single character, such as an asterisk (*) which can be interpreted as a literal character or an empty string. It is frequently used in file searches so the full name does not need to be typed. In the IOS, Wildcard Searches implementation is as follows:

For example, to search for the subject "woman" or "women" we can use the following search strategy: wom?n

To get the results that allow variations of search results, * can be used at the end of the characters typed.

For example, to search for words with the prefix test to look for the results of tests or tester, you can use the following strategies: test*

We can also use a * strategy on one of the characters between the terms we are looking for, e.g.: the*t

The use of symbols a * cannot be used at the beginning of the search character.

4) Range Searches

In its most common form, the range of search problems consists of preprocessing set of objects to determine the object of S that intersects the query object; it is what so-called range.

To show search restriction, e.g. restrictions on year search: [2005 to 2006]

5) Boolean Operators

Boolean operators are used to connect and determine the relationship between the search terms. While searching for electronic databases, we can use Boolean operators to narrow down or expand our recordset. The three Boolean operators are AND, OR and NOT. All of them are capitalized

D. Contributing Institution on IOS network

Partner Organization

- Muria Kudus University: E-Journal of MSE has been merged with journal.umk.ac.id and the repository on prints.umk.ac.id
- Jepara Nahdlatul Ulama Islamic University: <https://ejournal.unisnu.ac.id/> and <http://eprints.unisnu.ac.id>
- Institute of Health Science PKU Muhammadiyah Solo: <http://ejournal.stikespu.ac.id/> /index.php/profession/oai

E. IOS Benefits for Institutions

1) Empowering Discovery and Innovation

Indonesia One Search is a means to empower innovation in search of information in the digital networking era. Here are the informant's answers:

"Yes, sir. It is true that the IOS as a gateway to a lot of libraries in Indonesia has been already able to make it easy in searching references for the academicians. Of course, it has the domino effect simplifying the process of new works."

However, IOS has not yet fully bridged all accesses to the other institutions (through any procedure) for the reference sources that are not given in full-text.

An additional notification is required for the harvesting process that the iOS system has done so that the partner organization knows that the website is synched to the IOS network. In the future development, it is expected to have as such call center that quickly provides a response to be a means of communication between partner organizations and IOS managers, in this case, the National Library.

What makes it fun is that people can expect that IOS will not experience the same fate with the previous portal, e.g. Garuda. This is because IOS is managed by National Library of Indonesia (by its department focusing on information

services) which of course guarantees IOS sustainability and reliability. It is expected that this innovation continues to grow; in addition, it has also been already developed into IPUsnas system that can be accessed by using a smartphone. Recently, the Android version of IOS has been developed" (Noor Athiyah, August 10th, 2017).

"...joining IOS can accelerate recognition and deployment of the potential research results in supporting the scientific literature. Before joining IOS, library information resources are very limited by the collection owned; however, after joining IOS, it increases the number of various knowledge and research results that can be utilized in the development of further scientific works. By becoming IOS partner, the scientific works at local libraries will be quickly and more widely accessible" (Nurul Wardana, August 11th, 2017).

"Becoming the partner of IOS, the library will get better acknowledgment 'in the eye' of university leaders as an effort to strengthen the information network. It will also increase the value of institutions and libraries, especially during the implementation of filling and accreditation of the university, faculty, and study program. Having cooperation with the other libraries is positive because there is no single library in this world with the complete collection. Therefore, a cooperation of information network between libraries throughout Indonesia is necessary" (Asmani Lukito, August 15, 2017).

From their opinions, the author can conclude that the Indonesian One Search portal could bridge the information needs of the members of library partners. IOS becomes a gateway to browse various sources of the libraries in Indonesia and to accelerate the distribution of scientific works owned by members. However, there are some notes for development, such as, the National Library needs to provide call centers for partners which experience technical problems. It is also hoped that there will be a guarantee for the sustainability of this program, so it will not end like the previous portal, i.e. Garuda.

2) Library Visibility

In the digital era, library visibility is an significant thing to make the libraries easily accessible for users from various locations. Here are the answers from the informants:

"Library Visibility is not visible compared to the visibility, as an effect from search through google. In this case, the promotion should be constantly promoted considering that IOS as a source information reference in Indonesian Language which is easier to read by the community. The Informant hoped that all IOS partners could help to promote IOS to increase its utilization. Up to now, the use of Google search engine still dominates the activities of academicians in seeking for information. The informant added that if IOS is intensively promoted, it will boost the usefulness of journal and the repository of IOS partners" (Noor Athiyah, August 10, 2017).

"There are several benefits of joining IOS such as the partners are connected to the other library portals throughout Indonesia. It means that there is digital information network

among the partners and it gives benefits for various titles of scientific works available in the network. It will also make the search can be carried out everywhere in a real time. In addition, it increases the existence of libraries. Being the IOS partners will make the previously unknown library nationally noticed through IOS portal" (Nurul Wardhana, August 11, 2017).

"IOS will also be helpful for library visibility since the number of web visitors will increase and impact directly on their libraries" (Asmani Lukito, August 15, 2017).

From the opinions of the informants, there are two different opinions. The informant from UMK suggested that though becoming the IOS partner, the visibility is still better when using Google search. It is advisable to require every partner to help the promotion for better visibility through IOS in the internet network.

Another partner argued that joining IOS provides several benefits such as inter-connected libraries, facilitating information retrieval and adding visibility value for member library.

The author concluded that to improve the visibility of the library like Google, it is necessary to continuously promote IOS. Being the IOS partner allows partner library users to know each member's collections.

3) Development of Scientific Communication

By joining IOS network, the partner libraries can be connected each other. It will lead to positive effects for users in obtaining the required information and is supported by various possible topics that will enrich the knowledge of network users. Below are some informants' answers.

"Joining IOS portal network bring benefits e.g. it gives positive influences for the institution as well as users to have scientific communication without being in the same place. IOS allows the researchers to exchange their minds from the results of research/scientific works published in IOS network. The previous researchers who may not know each other could read the results of recent researches related to various subject of knowledge. Through the visual menu, IOS user may know the distribution of subject collection from libraries which have become the IOS partners. The scientific communication will also complete the existing research results and deepen certain study to be more specific" (Asmani Lukito, August 15, 2017).

"The benefits of becoming a partner of IOS is sharing information digitally among the library partners and providing various titles of scientific works available in the network so that students can have the opportunity, for example, to develop various scientific papers/thesis to be prepared" (Nurul Wardhana August 11, 2017).

From the opinions above, the author concluded that IOS provides benefits in the development of scientific communication because various titles of scientific papers can be read through the network. This case allows IOS users to have various options for developing advanced scientific work and more in-depth studies based on previous research results presented in the network.

The applications used by each library include space and reprints. It means that the need to establish scientific communication across disciplines is also highly conducted in Spain. The presence of an e-science network provides the ease and speed of time in searching and finding the required scientific works. The information consortium built between university libraries, in addition to developing digital full-text materials, presents electronic documents in the form of photos and image documents.

4) Various model of information search

IOS network provides information search options with simple and advanced search menus. Below are excerpts from the informants related to the topic?

"IOS portal is equipped with diverse information search models. There is a simple and advanced search model. These features enable IOS users to search in various ways. These different ways of searching give experience for IOS users" (Nurul Wardana, August 11, 2017).

"In our library, the search tips have not been fully and optimally used because the users have already taken the advantage of this portal" (Asmani Lukito August 15, 2017).

From the aforementioned opinions, the author concluded that the search features in IOS consist of (1) simple search, and (2) advanced search. The existence of these two ways makes it easy for novice users to take the advantage of IOS. The advanced search provides an experience for users to get more specific information on demand.

IV. CONCLUSION

From the research activities successfully conducted, the author concluded that: (1) Indonesia One Search is a place for gathering various national collections to develop science and various scientific works from the community. (2) The development of digital information network for Indonesia One Search is an innovation to encourage the access to various research works to be utilized and read by all levels of society. A large number of colleges, of course, will provide a great input to lead the new research results. The results of research and the other scientific publications must be accessible indefinitely through time and space. Therefore, being IOS partner is one of the means to participate in developing scientific knowledge and communication. (3) The existence of IOS gives benefits to the partner libraries to be better known and have a network information for the improvement of services for their respective users. Being IOS partner provides an opportunity for users to broaden their insights into diverse published works. (4) Various search features embedded in IOS provide the users with experience in seeking for both general and specific information sources within the network. (5) Being integrated into IOS network provides an opportunity for scientific researchers to open-up scientific communication in various regions across Indonesia. Each researcher can ethically take the advantage of the research results for further development in each region and thus they give effect to the advance of knowledge and the nation.

V. REFERENCES

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