

A Planning Study on National Management of Publicly-Funded Paper Articles

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Abstract—many countries' funding agencies have increasingly adopted open access policies on publicly-funded research results. In Korea, publicly-funded paper articles are not collectively deposited at national level due to a copyright or a license problem. Some intellectual rights of domestic researchers are not systematically protected while they are depositing, managing, and using publicly-funded papers. Nevertheless, national policies and deposit systems in Korea are not sufficient for national management of publicly-funded paper articles. In this paper, we investigate other countries' cases on publicly-funded paper articles, and analyze their policies and systems in order to find applicable implications. To do this, we also compare their cases according to our purpose. Subsequently we present a public deposit framework for national management of publicly-funded paper articles, which makes the scope and requirements of our planning study clear. Finally, we identify our future works according to the proposed framework.

Index Terms—publicly-funded research paper, open access, public deposit, self-archiving

I. INTRODUCTION

Recently, open science is a paradigm that is promoting the scholarly dissemination of research through freely opening research results. Many countries' funding agencies have increasingly adopted rules and policies to promote or mandate open access [1]. Publicly-funded research is an important means for the society to create knowledge, support innovation, and promote growth [2]. Research articles from such research are knowledge resources to be shared by all [2]. Therefore, national governments and several major research funding bodies have begun requiring research outputs resulting from their funding to be made publicly available through open access repositories [2]. In addition, openness is a key principle in Horizon 2020: researchers receiving grants from Horizon 2020 must deposit a machine-readable electronic copy of the published version or peer reviewed manuscript accepted for publication in an open repository [3].

However, in Korea, publicly-funded papers are not collectively deposited at national level due to a copyright or a

license problems, etc. Some intellectual rights of domestic researchers are not systematically protected while they are producing, managing, and using national R&D papers. However, policies and systems are not sufficient for national management of publicly-funded paper articles.

In this paper, we investigate other countries' cases on publicly-funded paper outcomes, and analyze their policies and systems in order to find applicable implications. To do this, we compare their cases according to our purpose. Subsequently we present a public deposit framework for national management of publicly-funded paper, which makes the scope and requirements of our planning study clear. Finally, we identify our future works according to the proposed framework.

II. CASE STUDY

Governments and major research funding bodies adopted open access policies of publicly-funded research results. Their open access policies are defining regulations and processes for public deposit of publicly-funded papers. In this paper, we first analyze them in terms of public deposit for national management of publicly-funded papers, and we find some implications for our study as described in Table 1. And in Table 2, we compare their policies for the purpose of finding requirements and tasks to public deposit for national management.

A. USA, NIH [4, 5]

The US Government directed in the Office of Science and Technology Policy that all federal agencies with more than USD 100 million per year in research and development expenditure are required to develop plans to make the published results of federally funded research freely available to the public within one year of publication. Each ministries and funding agencies made a regulation for open access on publicly funded papers. In Particular, public deposit policy of the National Institutes of Health (NIH) requires that peer-reviewed journal publications resulting from NIH-funded research be made publicly available through the repository PubMed Central (PMC). The NIH shall implement the public access policy in a manner consistent with copyright law. The policy applies to any manuscript that is peer-reviewed and accepted for publication in a journal on or after April 7, 2008. Of course, authors may submit final peer-reviewed manuscripts accepted before April 7, 2008 that results from NIH funds.

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B. UK, RCUK [6,7]

The Research Councils UK (RCUK) is consisting of the seven autonomous research councils that encompass several areas such as the humanities, social studies, art, science, engineering, medicine, etc. The RCUK guides peer-reviewed and published research papers to make unrestricted on-line access. This policy applies only to the publication of peer-reviewed paper articles and conference proceedings that acknowledge funding from the RCUK. In particular, in UK, their researchers that produce the research papers, are expected to publish any peer-reviewed research papers resulted from the RCUK funding in journals that are compliant with the RCUK policy on open access. If researchers don't publish their papers to open access journal, they should deposit them any repository. The authors and their research organization can choose a repository for depositing their paper articles by their discretion. However, some Research Councils have a requirement that papers must be deposited in specific repositories.

C. Spain, FECYT [8, 9, 10]

Spain is also processing legislation requiring publicly-funded research to be made freely available through open access repositories. It regulates Science, Technology and Innovation Act article 37 for open access. In particular, Spanish Foundation for Science and Technology (FECYT) established some open access policies and developed a repository. Also public authorities in the law on Science, Technology and Innovation Act should develop a repository for opening the publications of the institutional researchers and linking other repositories. In 2008, RECOLECTA was created by FECYT. The RECOLECTA is nationwide infrastructure of scientific open access repositories. The RECOLECTA promotes and coordinates integrated digital repositories for open access, the dissemination, and preservation of Spanish scientific research outputs. The RECOLECTA is the first approach in the national level to coordinate the Spanish repositories and its interoperable relationships with the international development of the global repository.

D. Japan, JST [11]

Open access policy was promoted in the 4th Science and Technology Basic Plan. In recognition of this situation, Japan Science and Technology Agent (JST), as a key institution in the dissemination of science and technology information as well as in the distribution of public funding resources in Japan, makes an effort to promote open accessibility of academic papers from projects supported by JST funding. Using the institutional repositories that are promoted by the national policy as a basis, JST will implement this open accessibility only with the explicit consent of the journal the researcher has published within the embargo period of the institutional repository. JAPAN prefers to make a public access policy through green open access policy because of a copyright problem, etc. JST aims to make the results of research funded by JST open to view fully on the internet as soon as possible after publication.

TABLE 1. SUMMARY OF MAJOR IMPLICATIONS

NATION	IMPLICATIONS
U.S	The FASTR was provided as a bill. It was directed that the Federal departments and agencies have made in response to an OSTP policy memorandum to support increased public access to the results of federally funded research. Each ministry and funding agency made a regulation for open access on publicly funded papers
UK	Although it is not in the bill, it promotes strong OA policy. In considerate of sectoral characteristics, it is directed to deposit publicly funded papers into each repository.
SPAIN	It builds and operates a national repository in separation with academic / institutional repositories. And it defines interoperability standards between national repositories and academic / institutional repositories.
CAS	A copyright law deals with the issues of open access on publicly funded papers. Authors have copyright of last version, and they should follow CAS open access policies.
JAPAN	It promotes a public deposit and open access policy through a science and technology basic plan besides a law.

E. China, CAS [12]

The Chinese Academy of Sciences (CAS) requires its researchers and graduate students to deposit an electronic version of the final, peer-reviewed manuscripts of their research articles, resulting from any public funded research projects. That is, the CAS requires its researchers to deposit electronic paper articles which are submitted and consequently published in academic journals after the issuing of this policy into the open access repositories of their respective institutes. Also researchers should deposit their paper articles at the time the articles are published for making publicly available within 12 months after publication. CAS encourages its authors to deposit those articles published before this policy into respective institutional repositories. CAS supports its authors to publish research articles from publicly funded research projects in open access academic journals with reliable quality control and reasonable article processing charges.

III. PUBLIC DEPOSIT FRAMEWORK FOR NATIONAL MANAGEMENT OF PUBLICLY-FUNDED PAPERS

We present a public deposit framework for national management of publicly-funded papers, which makes the scope and requirements of our planning study clear. To define our framework, we first identified six kinds of questions that actors such as researchers, research institutes, funding agencies, publishers, and governments should answer when they deposit their publicly-funded paper articles to a repository. Therefore, the proposed framework defines deposit problems and issues that should be dealt with according to the six kinds of questions such as why, who, what, when, how, and where as described in Table 3. Six kinds of questions help us define the requirements for establishing the public deposit policy and its process, which can be categorized to three kinds of concerns.

TABLE 2. COMPARISON ON PUBLIC DEPOSIT POLICIES OF MAJOR COUNTRIES

구분	USA	UK	SPAIN	CHINA	JAPAN
	NIH	RCUK	FECYT	CAS	JST
Charateristic	NIH funded research papers should be obligatorily deposited to PubMed Central. Legally mandated	RCUK defines open access as unrestricted, on-line access to peer-reviewed and published research papers. Recommended by agency policy	Spanish Foundation for Science and Technology (FECYT) established some open access policies and developed a repository. Legally mandated	CAS requires its researchers and graduate students to deposit their public funded scientific research articles. Recommended by agency policy	JST aims to make the results of research funded by JST free to view in full on the internet as soon as possible after publication. Recommended by agency policy
Area	Health and medicine	Humanities, social, arts, engineering, science, medicine, etc.	Science and Technology	Science and Technology	Science and Technology
Level	Obligation	Obligation	Obligation	Obligation	Recommend
Target of deposit	Peer-reviewed papers	Peer-reviewed papers	Authors' final version, Published version	Authors' final version, Published version	Authors' final version, Published version
Repository	PubMed Central	Sectorial repository	RECOLECTA, Scholarship/Institution repository	Knowledge repository	Institutional repository
Time of deposit	Within 12 months after publication	Publication allowed, at the end of embargo	Publication allowed, within 12 months after publication	Publication allowed, within 12 months after publication	Publication allowed, within 12 months after publication
Embargo	12 months	Different according to area	12 months	12 months	Green OA : 12 months, Gold OA : immediately
Copyright	It is recommended that researchers negotiate with journal publishers on copyright	Generally, authors hold	By contract	-	It is recommended that researchers negotiate with journal publishers on copyright
OA Method	Gold OA/ Green OA	Gold OA prefer, Green OA allowed	Gold OA/ Green OA	Green OA default	Green OA default, Gold OA allowed
Law / Regulation	Federal Research Public Access Act (2009 ~ 2012), Fair Access to Science and Technology Research Act of 2015	The government has approved the Finch report 2012 on expanding access to research outcomes	Science Technology Innovation Act Article 37	Copyright	Science and Technology Basic Law Article 13, Research Development Enhancement Act Article 35, Science and Technology Basic Plan(4~5)

TABLE 3. A PUBLIC DEPOSIT FRAMEWORK FOR NATIONAL MANAGEMENT OF PUBLICLY-FUNDED PAPER ARTICLES

5W1H	REQUIREMENTS	CONSIDERATION	CONCERNS
Why	Why should we deposit our papers? What are other incentives except regulations or policies? Characteristics of programs and subject areas should be considered.	Reasons should be reflected on policies . Proper incentives is necessary to promote deposit. Law and regulation should be concretely defined. .	Law, regulation, and public deposit policy
Who	Who is required to deposit in national repository? Who is more effective to deposit? It is important to provide ease of submitting once	Efficiency of deposit should be considered. -Researchers -Government ministries -Research funding agencies -Universities and public research institutes -Libraries, repositories and data centers -Private non-profit organizations and foundations -Private scientific publishers -Businesses	Public deposit process
What	What is the target of deposit ?	Implementing policies should be easy and realizable -Submitted version -Accepted version -Published version	
When	When should paper articles be deposited ?	At the end of embargo Time of deposit Baseline	
How	How should paper articles be dealt with in the process ?	Public deposit process Role and responsibility Verification procedures	
Where	Where should we deposit our paper articles ? What kinds of repository are there? What kinds of metadata should be registered ?	Functionality of repository Distributed model vs. Integrated model Collection method Metadata standard	Public deposit repository

IV. DESIGN OF BASIC PLAN FOR NATIONAL MANAGEMENT OF PUBLICLY-FUNDED PAPERS

We define three kinds of works for making a basic plan for national management of publicly-funded paper articles. These works are closely related with requirements of the public deposit framework defined in Table 4. Therefore we will investigate best cases which are proper to our research environments and culture, and define applicable solutions according to the requirements described in the framework.

TABLE 4. REQUIRED WORKS FOR MAKING BASIC PLAN

CONCERNS	WORKS
Policy	Analysis of other countries' OA policies and status Analysis of funding agencies' policies Understanding relationships between actors Development of public deposit policies
Process	Survey of other countries' public deposit process Survey of this country's paper outcome management process and status Design of public deposit process
Repository	Survey of other countries' repositories Survey of this country's repositories Design of national repository's target model

A. Public deposit policy

Government and research funding agencies are key actors in the promotion of open science efforts such as open access,

open collaboration, and open data since they are responsible for defining the obligations and requirements to benefit from funding a research. We have to define some deposit rules and policies about copyright, self-archiving, time of deposit, version of target papers, and embargo. Also we have to define mandatory rules, incentive mechanisms, and enablers including infrastructure developed to share articles or data.

B. Public deposit process

There are also many kinds of actors such as researchers themselves, researcher community, government ministries, research funding agencies, universities and public research institutes, libraries, repositories and data centers, private non-profit organizations and foundations, private scientific publishers, businesses. Therefore we have to establish detailed processes, and define roles/responsibilities of each actor. In addition, efficiency of deposit should be importantly considered. We should also define what kinds of paper version, embargo, time of deposit, time of baseline, and verification procedures. In here, we should importantly deal with a reason why researchers have to deposit their papers.

C. Public deposit repository

In recent years there has been an increase in both the number of institutional repositories and the number of digital objects deposited in them. Publisher's policies vary that allow posting of a green copy of papers. Publishers are generally restrictive with allowing self-archiving on any freely available website. Therefore we have to design a target model of national repository that efficiently supports the deposit process. In here, we have to deal with linking problem between national repository and regional repository, linking standards, and metadata to be inputted. In addition, the public

deposit repository should play various roles phase from a submission phase to a preservation phase and a share phase.

V. CONCLUSION AND FUTURE WORK

We investigated other countries' cases on publicly-funded paper articles in terms of public deposit for national management of them. We compared characteristics of their policies, and we found significant implications for national management of publicly-funded papers. In addition, we defined a public deposit framework for national management of publicly-funded papers, and identified our future works according to the framework.

In the future, we will develop policies and national repository for national management of publicly-funded papers of Korea. In addition we will study economic effects of our study.

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