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This study follows the rapid and substantial growth of institutional repositories in Japan, and evaluates the publicly searchable content of 86 IRs made available through Japan's web portal, JAIRO, and the NII Institutional Repositories DataBase Contents Analysis System. The findings are examined from an international and comparative framework, and highlight variations in Japanese academic scholarship and publishing, as well as ongoing challenges in the areas of faculty participation, copyright and peer-review.

Headings:

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JAPANESE INSTITUTIONAL REPOSITORIES: WHERE DID THEY COME FROM
AND WHERE ARE THEY HEADED?

by
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INTRODUCTION

Global trends in scholarly communication increasingly gravitate towards a digital environment, and the development of the open access movement and electronic publishing have been outgrowths of this process. One specific intersection of these areas is the institutional repository (IR), a type of digital library in which the intellectual content of an academic community is intended to be organized, preserved, and made freely available to the public. For the most part, this movement has been led by academic libraries and research institutions in the United States, United Kingdom, Germany, Netherlands, Australia, as well as a few others, and is well-documented in the professional library literature. There is, however, far less information available in English regarding the development of institutional repositories in East Asia, and this absence is particularly notable given the unusually large and rapid development of IRs amongst Japanese research institutions. In April 2006, there were thirteen institutional repositories in Japan (Cyber Science Infrastructure Development Department: NII, 2008), and this number had climbed to more than eighty-two within a two year time span (National Institute of Informatics, October 23, 2008). Based on worldwide numbers in both OpenDOAR (Directory of Open Access Repositories) and ROAR (Registry of Open Access Repositories), this growth has placed Japan as the fourth leading nation in

IR development (see Appendix A). Much of this success is undoubtedly connected to government support as well as sponsorship from Japan's National Institute of Informatics (NII), a leading inter-university research institute. Despite its relative late entry onto the IR stage, Japan has benefitted from a carefully phased launch of individual repositories and research projects, and built a level of infrastructure which encompasses local institutional needs while also providing a framework for shared access across a nationwide knowledge-distribution network. In line with similar trends which are occurring in Europe, Japanese IRs can be accessed both at the individual local level and through a single web portal called JAIRO (Japanese Institutional Repositories Online), which provides the end user with a seamless entry to scholarship across all national research repositories. Although indicators clearly point to impressive achievement and success, Japanese repositories still remain in their very early infancy and the extent of their impact remains to be seen. While increasing growth and total number of IRs are factors which can be used to evaluate the status of open access repositories in Japan, there are various other criteria that must also be weighed. Additional information such as total item counts, content material types, representation of multiple academic disciplines, usage statistics and access to full-text as opposed to metadata are all measures with which to evaluate the strength and possible impact of these repositories. Thus, in order to address a comparative lack of literature specific to Japanese institutional repositories, this study has three objectives. The first is to provide a snapshot and context for the current IR development in Japan. The second is to evaluate characteristics of Japanese institutional repositories, and determine the operability of these sites for providing access to scholarship. Third, because institutional repositories are inherently tied to a global

trend and evolution of scholarly communication throughout the world, these findings will

be looked at from an international perspective and comparative framework in order to

examine similarities and challenges.   Specifically, differences in academic scholarship in

Japan will be highlighted, as well as mutual concerns regarding faculty participation,

copyright and peer-review - all of which are cited as obstacles in preventing maximized

growth and potential for institutional repositories.

Rather than attempting a survey sampling, this study focuses on the publicly

searchable content of Japanese institutional repositories and examines the recent data

which has been made accessible online through the National Institute of Informatics.

Specifically, this includes the NII Institutional Repositories DataBase Contents Analysis

System (National Institute of Informatics, November 31, 2008) and JAIRO Usage

Analysis (National Institute of Informatics, Nov 18, 2008). Each of the 86 organizations

included in the JAIRO portal (http://jairo.nii.ac.jp/en/) were also searched to gain a sense

of the academic disciplines represented, as well as an awareness of outliers and

universities with significant deposits. As academic journal articles and kiyo (Japanese

departmental bulletins) are the two most predominant materials found in JAIRO, searches

were also conducted within each IR to determine the distribution ratio of these two

resources amongst the 86 organizations. Multiple search options provided relative ease

in accessing the data; however, it should be noted that a lack of correlation between

Japanese and American academic departments and disciplines, coupled with the inability

to browse this information in several large IRs, enabled only a generalized assessment of

the various disciplines. A detailed analysis of academic disciplines remains outside the

scope of this paper, and would be an interesting element for future studies on this topic.

The JAIRO web portal and 86 institutions were accessed in November 2008,

approximately one month following the October 22nd launch of the site succeeding the

initial test version known as JuNii+. A list of the 86 research institutions and the data

collected can be found in Appendix B.

CONTEXT AND BACKGROUND OF IR DEVELOPMENT

Perhaps the most widely used definition of an institutional repository is "…a set

of services that a university offers to the members of its community for the management

and dissemination of digital materials created by the institution and its community

members"(Lynch, 2003). This definition has been used by Japan's NII in the

development of IRs, and for the purpose of this paper is the most applicable, as it

highlights both the notion of service and local development , while also allowing for the

changing environment of policies, platforms and content which is emerging throughout

the world. As institutional repositories continue to multiply and grow, and are

increasingly expected to be an essential infrastructure for fostering scholarship in the

digital world, it becomes necessary to consider the purpose and mission of these

repositories, and why they have come to exist.

The expansion of IRs, for the most part, is a reply to challenges and changing

models which have emerged from the development of internet technology and the

tremendous growth of information associated with it. While there are significant benefits

associated with these changes, there have also been undeniable challenges. For example,

while there has been a dramatic increase and ease of access to research as serial publications increasingly move to digital format, there has also been a significant impact on library acquisitions budgets, which are challenged by a relentless rise in fees associated with these journals. Although collaborative collections and consortia amongst academic libraries have helped to mitigate some of the associated costs, the concern remains that unless there is a change in the paradigm, research libraries may eventually be faced with offering less content rather than more.

This phenomenon is well known internationally and is applicable to Japanese libraries as well, where the price of prominent foreign (predominantly English-language) journals was estimated by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) to increase at an approximate rate of 10% annually (Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2006). As Japan is reported to be one of the largest producers of scholarly articles in the world - second only to the United States since 1990 – the continued acquisition and collection of these foreign journals is essential to research, and is particularly emphasized as there are no major publishers in Japan with international circulation (Takeuchi & Tutiya, 2007). Given the importance of foreign commercial journals, the consistent rise in subscription fees has been particularly frustrating in light of the long-term economic challenges in Japan which have also resulted in annual decreases in library budgets (Hisono, 2006). For example, at Keio University Library, one of Japan's leading private research universities, the library acquisition budget totaled 1,725,849,126 JPY in 2004, but had dropped to 1,657,015,591 JPY for 2007; an approximate 4 percent reduction equivalent to more than 600,000 US

dollars (Keio University Media Center, 2006). These types of cuts have been occurring across most Japanese universities, and in order to respond to the e-journal crisis, national and private universities have formed consortia in an attempt to negotiate better prices. Despite this cooperative activity, however, it has been argued that large gaps in quality, status, and service amongst various Japanese academic libraries results in challenging difficulties for the creation of effective and easy partnerships (Hisono, 2006). As such, an easy fix remains difficult to achieve.

Along with budget problems, the changing electronic journal environment has created a significant loss of control over the very resources for which the library pays. Licensing restriction places limitation on who is able to use the material, and because a number of commercial publishers have differing licenses with libraries, a straightforward access policy is often not possible (Jones, 2007). Long term access also becomes a significant issue when the digital content is not actually owned by the library. Preservation and perpetual access are no longer within the control of the library with an electronic subscription, and there are ongoing concerns over titles being cancelled by the publisher, or problems which could arise when a publisher ceases business or is unable to maintain the digital archive (Jones, 2007). Under these conditions, research libraries throughout the world are finding it increasingly challenging to fulfill their traditional mission of collecting, organizing, preserving, and providing access to all forms of intellectual content for the faculty and students they serve.

Yet, despite these ongoing challenges in the journal environment, the evolution of internet technology has, in fact, increasingly encouraged the wide spread distribution and availability of knowledge. In contrast to the business model of commercial publishing, the internet allows for instant global publication without the need for printing and distributing, and allows communication to be conducted in more socially equitable ways. This development has naturally given rise to the open access movement, which calls for a more expansive and collaborative circulation of scholarship, while also eliminating the high cost and stronghold associated with the commercial publishing industry. These benefits have been embraced by numerous scholars, academic libraries and institutions around the world, and have resulted in the 2001 Budapest Open Access Initiative (BOAI) on peer-reviewed research literature, as well as the Bethesda Statement on Open Access Publishing and the Berlin Declaration on Open Access to Knowledge in the Science and Humanities, both of which were issued in 2003. These initiatives represent many points of view, academic disciplines, and nations, which all share in an international effort and vision of making knowledge freely available on the Internet for purposes of education and research (*Berlin Declaration on Open Access to Knowledge in the Science and Humanities.*2003; *Bethesda Statement on Open Access Publishing.*2003; *Budapest Open Access Initiative.*). While the open access movement has yet to create an equally strong awareness and following in Japan, it should be noted that signatures from both NII and Hiroshima University Library have been added to the BOAI in support of the initiatives. (*Budapest Open Access Initiative.*)

As open access continues to gain acceptance as an alternative to the traditional subscription-based publishing model, it is supported by two additional factors which impact research. One of which is the facilitation of timely access to research and scholarship. By reducing the amount of time between discovery and dissemination of research findings, the open access movement has much appeal for areas of scholarship with rapid technological and scientific advancement. Similarly, there are a number of growing studies which reveal a dramatic increase in citations for open access articles (Antelman, 2004; Harnad & Brody, 2004; Lawrence, 2001). For example, a study by Steve Lawrence in computer science indicated that there was a 157% increase in favor of the number of citations to online articles as opposed to offline articles (Lawrence, 2001). This was also supported by Kristin Antelman's data, which showed similar increases in citations for open-access articles in four other disciplines: philosophy, engineering, political science and mathematics (Antelman, 2004). This suggests that the ease of access to online articles is an important factor for research in gaining a wider readership, as well as recognition and impact for future academic scholarship. In sum, the open access movement encourages expanding global access at a local level, and allows "scholars both within and outside institutions to make their work available in the easiest and most economical way to the widest possible audience at the earliest time after the completion of their work" (Jantz & Wilson, 2008).

Not surprisingly, it is within these contexts of spiraling journal subscription fees, support for open access, and evolving information technology that has given rise to institutional repositories as an intersection and potential means for collecting, preserving,

and freely disseminating scholarly resources. Because of their potential impact, as well as retained control over portions of an institution's intellectual property, research libraries have been the forerunners in developing and promoting these new systems. Many academic libraries have invested human effort and technical resources in order to build a level of infrastructure that can foster access to the intellectual outputs of their institution, while also establishing a potential means for challenging the current publishing model (Bankier & Perciali, 2008; Jantz & Wilson, 2008; Smith, 2008). Due to their ability to address many of the shared concerns of libraries in the digital age, development of institutional repositories has become a global phenomenon – created and embraced by libraries throughout the world.

Increasingly, the benefits and services of institutional repositories are being expanded, and the role for IRs is moving beyond that of archival storage and accessibility. Current marketing initiatives and international trends for institutional repositories are exciting and bold, and focus on two primary directions of growth: the repository as a showcase for scholarship and institutional visibility, and the repository as a platform to publish original content. These trends tend to be complimentary, and there is momentum to create tools and services which respond to faculty needs and behaviors, and can assist them in creating an online professional identity that can be presented through the gateway of the repository. Jean-Gabriel Bankier and Irene Perciali have suggested services such as personal scholarly web pages that are controlled by the author, and include links to selected articles and content which the faculty member wishes to share with the world (Bankier & Perciali, 2008). This approach would be especially

helpful in cases such as the United Kingdom and Germany, where repository content and metrics are beginning to be utilized for internal institutional review exercises and promotion (Herb & Muller, 2008; Johnson, 2007). Similarly, there are discussions for Web 2.0 services which facilitate communication and collaboration of scholars with matching interests, and encourage the creation of online, open-access journals which are written, read, and commented by scholars in a similar field (Bankier & Perciali, 2008). This suggests movement towards an alternate form of peer-review, one in which article reviews take place after initial publication, rather than in advance. The current digital environment can support this type of referee system by allowing individual reviews of articles to be collected and published in the open access institutional repository.

Universities and IR stakeholders have a growing interest in this avenue of local-level publishing, and demand appears to be significant. As a whole, institution-based journals tend to have low content flow and small audiences, but are recognized for their ability to fill needs in niche fields, specific regions, or new and emerging research (Bankier & Perciali, 2008). Some studies, such as the Digital Commons repository at the University of Nebraska, indicate that it is precisely this type of original content, unavailable anywhere else, which is most likely to be downloaded on their repository (Royster, 2008).

These findings are of particular interest for Japanese universities where there is noted predominance, particularly in the social sciences and humanities, for article publication to occur within university departmental journals and bulletins rather than

through private commercial publishers. These departmental bulletins, known as kiyo, are

an inherent part of the academic culture of Japan, and while it is difficult to estimate an

exact number because of varying definitions for the format, at the recent August 2007

Berlin 5 Open Access conference, it was reported that there are currently 15,000 Japanese

kiyo titles sponsored through university publication (Takeuchi & Tutiya, 2007).

Traditionally, these departmental journals have existed in print form, and have been a

primary means for scholars to publish their academic research and advance their careers

within their institutions. The kiyo connected to particular universities or disciplines, such

as literature, history, and philosophy, are often reputable, and tend to dominate the media.

In fact, it is said that 30 percent of all kiyo published by Japan's national universities are

related to literature. This is in contrast to the 3 to 8 percent which are published in

science, engineering, law and economics (Kamada, 2007).

Despite the prevalence of kiyo, however, they have often been considered a

problematic scholarly medium by academic libraries, and are primarily thought of as a

form of gray literature. For one, they are published in limited quantities (typically a few

hundred copies per issue), and have limited distribution channels often centered on

donation and exchange between departments (Kamada, 2007; Takeuchi & Tutiya, 2007).

Another significant issue, however, is the lack of peer review or quality control for most

kiyo. The articles are generally published, without a referee system, by a small group of

scholars who make up the department distributing the kiyo, and draw continual concern

and criticism about their effectiveness as a source of scholarly publishing (Kamada,

2007).

The emergence of institutional repositories, thus, presents a unique and noteworthy opportunity for the Japanese publishing of kiyo. It offers the potential for wider access and distribution of Japanese scholarship through an open access digital format, and places this medium as a primary choice when considering IR initiatives for Web 2.0 collaboration and post-publication peer review. Given that most social science and humanities journals, even the large national-level societies in Japan, are often affiliated with specific institutions and do not always employ a peer-review system, the digital environment of the institutional repository can offer a valuable opportunity for reform and improvement of scholarly communication in a number of academic fields (Kamada, 2007). It opens the door for greater access, evaluation, and ultimately better research.

Despite a promising future, however, much of the development for institutional repositories remains in the planning stages, and have yet to be fully realized due to the infancy and ongoing evolution of this type of digital library. Perhaps the greatest barrier to realizing the envisioned future and success of IRs is related to a lack of faculty participation. Well-documented studies show that current faculty participation and awareness of IRs is extremely low, and further indicates that recruitment of IR content tends to drop significantly after the first few months/years (Jantz & Wilson, 2008; McCormick, 2006; Xia, 2007). Overall, this is resulting in a small number of objects within institutional repositories. Naturally, the utility of an IR is dependent on its size and the contributions made by faculty, and various countries are learning to adapt through

numerous strategies aimed at addressing this issue. These strategies may include

mandate policies, liaison/proxy deposits, or national initiatives and other activities which

are created to promote IRs, and will be discussed further in this paper. While ongoing IR

development has taken place against a backdrop of similar goals and challenges across

the world, many of the responses and national contexts tend to be quite unique. Current

IR research can benefit from a closer analysis of some of these variations, and in

particular examine some of the ways in which Japanese repositories fit into the overall

landscape.

JAPANESE INSTITUTIONAL REPOSITORIES

Like many European institutional repositories, Japan benefits from the promotion

and backing of IRs at a national level. Initial interest in institutional repositories began to

develop following a 2002 report from a subdivision of the Council for Science and

Technology at Japan's Ministry of Education, Culture, Sport, Science and Technology

(MEXT). Although institutional repositories were not specifically mentioned, the report

emphasized the role of libraries in supporting and reforming the academic information

infrastructure, and facilitating access to digital information, particularly in the areas of

humanities and social science (Ministry of Education, Culture, Science and Technology

(MEXT), 2002). Research into institutional repositories soon followed, and in 2004 the

National Institute of Informatics (NII), an establishment of MEXT, began collaborating

with six universities to conduct trials and introduce experimental implementation of open

access repositories to Japan (Y. Murakami & Adachi, 2006; Y. Murakami, Tutiya, & Sato, 2007). This was followed in 2005 by the addition of several other academic library collaborations, and brought the total experimental deployment of institutional repositories to 19 in Japan (Cyber Science Infrastructure Development Department: NII, 2008; Y. Murakami & Adachi, 2006; Y. Murakami et al., 2007). In concurrence with these events, the MEXT Council issued a 2005 report explicitly supporting the development of institutional repositories and highlighted their significance for the reform of academic information dissemination (Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2006). By June 2006, the pilot project had resulted in 17 fully operational IRs holding a total of 62,423 items, and heralded the start of a full-fledged plan for the launching of institutional repositories in Japan (Y. Murakami & Adachi, 2006; Y. Murakami et al., 2007).

With a budget of 300 million JPY (2.6 million USD) for the 2006 academic year and a two-year estimated project period, NII agreed to partner with a total of 57 universities for IR development (Cyber Science Infrastructure Development Department: NII, 2008; Y. Murakami & Adachi, 2006). A call for proposals was issued, and marked the first time in which Japanese university libraries were targeted for external competitive funding. This was a significant development in Japan, and encouraged recognition of the library as a powerful asset and potential provider of outside funding for the university (Y. Murakami & Adachi, 2006). In total, 77 proposals were received, out of which 47 were from the national universities. Selection as one of the 57 IR partners was considered a notable accomplishment, and "some universities announced the acceptance of the project

proposal as the top news on their university website" (Y. Murakami & Adachi, 2006). While still in the initial adaptation phase of institutional repositories, this type of campus-wide support has been a promising sign for IR development, as their function is to serve the entire university community, and not just remain a library owned and operated system.

While the overall movement to institutional repositories and digital journals has been cautious in Japan, and is perhaps characteristic of strong institutional traditions which are slow to change, there is evidence that much of the detailed planning has resulted in an impressive knowledge network and collaborative environment. Based on initial challenges and models which were encountered during the pilot phase, NII has been able to provide subsequent universities with valuable information, guidance and training for the integration of their own plans. This includes manuals and reports on all repositories operating in Japan, as well as Japanese-language translations of IR materials published by SPARC and various international organizations and institutions (Y. Murakami & Adachi, 2006). Workshops are provided for additional guidance on system selection and implementation of open source software. This can be especially useful as the individual university project funds are unable to cover the full cost of the DSpace localization package, and other models must be considered when limited budgets are taken into consideration (Y. Murakami & Adachi, 2006). Additional training sessions are also provided twice a year for librarians, and focus on IR trends, case studies, marketing strategies, copyright permission procedures, and grant proposal workshops (Y. Murakami & Adachi, 2006).

Another service which is provided by NII is perhaps more unusual. As Japan's leading inter-university research institute, NII enjoys the unique status of being the provider for the country's largest databases and union catalog. Their status enables them to harvest and release the data and digitized journals originating from each of the universities, and then send them via FTP or CD-ROM for those institutions which request support in the initial buildup of IR content (Y. Murakami & Adachi, 2006).

All of these services should not suggest, however, that collaboration is one-way, or that participation in Japan's IR development is a free ride for the universities. In addition to sharing the academic contents of their IRs through the national JAIRO portal, the partner universities are also expected to share their experiences and participate in IR research and development projects which can benefit the entire academic community. From 2006 to 2007, 37 of the 57 IR partners were commissioned to 22 various projects covering a wide range of operations such as: connections to link resolvers; integrated searches; development of IR evaluation methods; IR community development; in-house journal publication; alternate open source library modules; and much more (Y. Murakami et al., 2007).
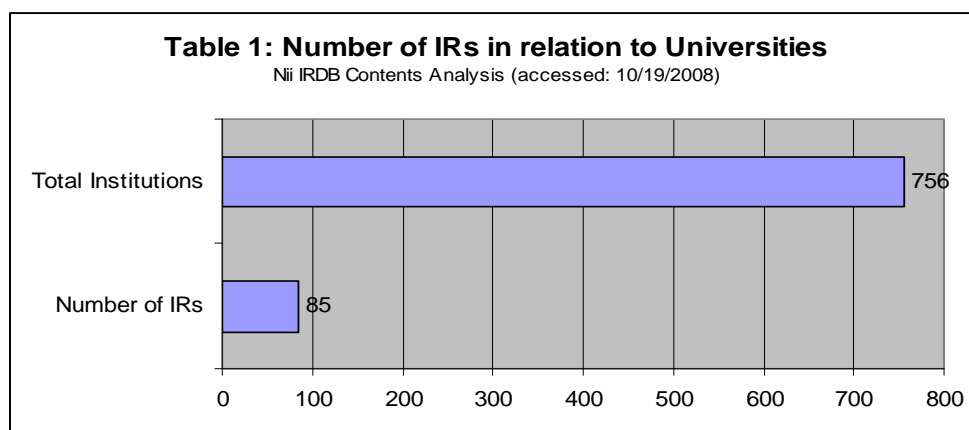
As a result of this pronounced effort and momentum, by the end of the project's first year (2006-2007), the number of institutional repositories had jumped to a total of 70, with 14 research projects designated for continuance into the future (Cyber Science Infrastructure Development Department: NII, 2008). IR deployment is still continuing to

advance and gain stride through 2008 and 2009, and NII is continuing to collaborate with 68 universities for further expansion of repositories. As a result, the number of current Japanese institutional repositories stands at 87 in October 2008, and more IRs are expected in the near future.(Cyber Science Infrastructure Development Department: NII, 2008; National Institute of Informatics, October 23, 2008)

As IR development enters a new phase of growth in Japan, emphasis still remains on further expanding the numbers. Additional attention, however, is being placed on collaborative services between repositories, as well as IR content construction. Priority and emphasis is being given to content items which showcase institutional strengths and achievements, and include research papers from national funding sources such as Kakenhi, and various other grants-in-aid programs (Cyber Science Infrastructure Development Department: NII, 2008). NII has also targeted the wider promotion and digitization of Japanese gray literature such kiyo and dissertations which have traditionally been difficult to search and obtain. For the 2008 to 2009 period, a target has been set to digitize 125,000 kiyo bulletins, 20,000 dissertations and theses, as well as 15,000 research papers for inclusion in various institutional repositories (Cyber Science Infrastructure Development Department: NII, 2008). By all estimations, both institutional repository numbers and IR content are expected to increase for the foreseeable future.

JAPANESE IR EVALUATION

The recent tremendous burst of Japanese IRs is undisputed, but accurate measures of success are not determined by growth and IR count alone. Detailed scrutiny and evaluation of the content are also needed to gain a better sense of the impact and scope of Japanese institutional repositories, and the question remains whether the current momentum can be sustained into the long-term future. NII's goal is to install institutional repositories across as many Japanese universities as possible, and although the number of IRs has increased by large percentages since their first experimental inception in 2004, the truth is that most universities have yet to launch a repository. While 85 university repositories can be accessed through the JAIRO portal, this represents only 11.2% of the total 756 universities in Japan for the 2008 academic year (see Table 1).

Table 1: Number of IRs in relation to Universities
Nii IRDB Contents Analysis (accessed: 10/19/2008)

Category	Value
Total Institutions	756
Number of IRs	85

Needless to say, all the universities have very unique and diverse backgrounds, and their status and support systems are not uniform; yet for simplification, it is still possible to divide them into three general classification groups: 87 national universities, 89

prefectural universities and 580 private universities (National Institute of Informatics, November 31, 2008).

Table 2: Japanese IRs by University Classification
Nii IRDB Contents Analysis (Accessed: 10/19/2008)

3.8%

2.2%

- National Universities
- Prefectural Universities
- Private Universities

70.1%
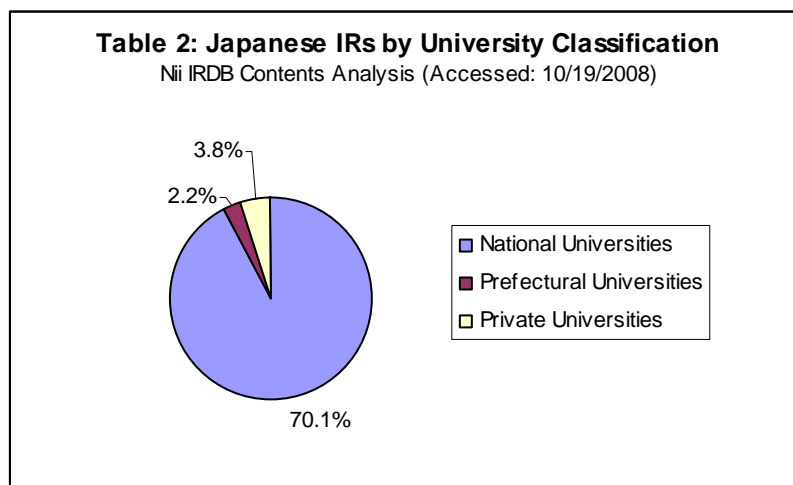
When looking at Table 2, it is clear that the distribution of IRs amongst these three types of universities is unequal.(National Institute of Informatics, November 31, 2008) On average, national universities are the most prominent institutions, and are able to provide a more favorable academic environment in terms of library provisions, technology infrastructure, research facilities, etc. With this in mind, it is not entirely surprising that the majority of IR proposals and acceptances have come from this group of universities. Although there are a small number of private universities that also enjoy status comparable to the national universities, their numbers are few and are indicative of the modest number of repositories which make up this otherwise large category of universities. Based on sheer numbers, as well as gaps in library quality and service, it will undoubtedly take many years before the remaining 671 universities see the deployment of their own institutional repositories. That being said, NII appears ready to

install IRs over a wide group of institutions, and have already prepared numerical categories for colleges, colleges of technology, and inter-university research institutes on their website, although no IRs exist in these categories to date (National Institute of Informatics, November 31, 2008). The project is indeed ambitious.

In looking at other areas of IR operability, initial entry and examination of the JAIRO portal becomes essential, and quickly provides a great deal of information even from a cursory glance. For the international user, perhaps the most striking option is the ability to move between Japanese and English interfaces, and the immediate awareness of the broad target audience this implies. The portal entry page also provides an initial breakdown of various types of resources found within the 86 repositories, and classifies items in much the same ways as other IRs throughout the world. The 14 resource categories include: academic journal articles; theses/dissertations; departmental bulletin papers (kiyo articles in Japan); conference papers; presentations; books; technical reports; research papers; articles (newspaper and other gray material); preprints; learning materials (teaching materials); data/datasets; software; others (largely digital photographs, primary documents and archival materials).

While outwardly sharing the same materials as many IRs over the world, a closer examination begins to reveal that the distribution and quantity for some of those resources differs, and is, in fact, a reflection of Japan's academic culture. Departmental bulletins (kiyo) are by far the most dominant resource in Japanese institutional repositories, and are followed next by academic journal articles, as seen in Table 3

(National Institute of Informatics, 2008). While it is difficult to make an exact parallel between kiyo and a similar genre in the United States, a 2007 international survey of IRs provides some means of comparison. Their results indicated that the average number of IR articles from non-refereed publications was about 415 for the entire sample, and approximately 742 for US repositories (*The International Survey of Institutional Digital Repositories,* 2007). These numbers are in contrast with Japan's mean which currently exceeds 2,400 kiyo articles (National Institute of Informatics, 2008). Alternately, a separate 2007 study of American institutional repositories found that 23% of US IR content consists of faculty work in gray literature and "items that have not been subjected to peer-review but are scholarly in nature" (McDowell, 2007). While kiyo are not the only gray literature contained in Japanese institutional repositories, they alone account for 38% of the content. In order to ensure that these numbers were not indicative of a small group of universities with high levels of kiyo publication, each of the 86 institutional repositories was individually searched, and the findings supported a fairly uniform distribution and representation of kiyo throughout (see Appendix B). In most cases, kiyo was the dominant resource, and there were several cases in which the number of IR contents was small, but consisted of nothing beyond this format. Much of these results highlight some of the differences that can be seen within Japanese academic publishing, and also point to ways in which these differences have created a complimentary fit with institutional repositories.

Table 3: Content of Japanese IRs

Nii IRDB Contents Analysis (Accessed: 11/20/08)

Category	Value
Others	64,819
Software	8
Data/ Dataset	457
Learning Material	3,552
Preprint	150
Article	22,435
Research Paper	8,741
Technical Report	2,344
Book	14,698
Presentation	1,194
Conference Paper	36,488
Kiyo (Dept Bulletin)	210,900
Thesis/ Dissertation	30,660
Journal Article	160,129
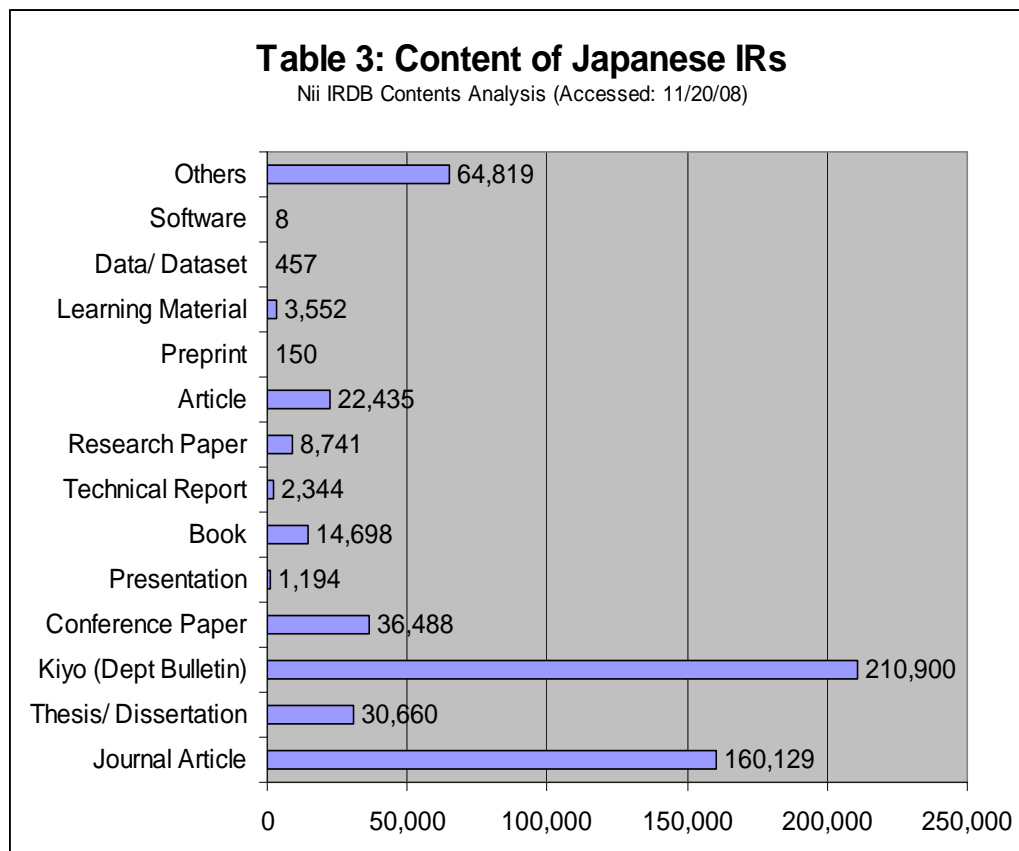
It can be argued that one of the driving forces for IR advancement in Japan is based on the strong institutional identification that is inherent in kiyo publication, as well as Japanese academia as a whole. Traditionally, Japanese professors have been recruited from within their own graduating institute, and on average remain in the same university department for the majority of their careers. While this model is certainly changing and recruitment is becoming increasingly open, a strong institutional attachment still remains and has been the primary impetus behind kiyo proliferation in Japan (Kamada, 2007). The closed, seniority-based nature of these academic departments has fostered a tradition of ongoing internal publication, and on some levels has acted as its own form of peer-review - albeit very narrow and influenced by a strong organizational culture. It is only

through the recent movements toward digitization and online publication that new opportunities for wider readership and reform are becoming possible. The movement from an institutional print publication to an institutional digital publication seems logical and straightforward, and alternately enables the IR to achieve one of its primary goals and missions as a showcase of the university's academic outputs. The relationship is complimentary.

Given that kiyo have dominated the Japanese academic publishing world since the end of World War II, and are becoming increasingly accessible and visible, it is unlikely that they will disappear anytime soon. Their ongoing publication will undoubtedly be a continual source of future IR content growth, and it is likely that Japan will not experience quite the same degree of content recruitment difficulty as many other repositories in the world. Interestingly, this growth may be further enhanced by some evidence that retrospective digitization of kiyo is taking place within a few of the repositories. When examining individual IRs, it was noticed that there were numerous empty headings and markers for kiyo bulletins, and that digitization appeared to be moving from the present to the past. If retrospective digitization were in fact a widespread initiative, this would result in an enormous amount of predominantly open-access articles within Japan's institutional repositories.

Beyond adding to future IR content growth, it would appear that kiyo publications are also responsible for a wide array of disciplinary and subject representation in Japan's IRs. An exact study becomes problematic, unfortunately, as the colleges and academic

departments in Japanese institutions are not necessarily aligned with specific disciplines, nor do they always correspond with the classifications used in other countries. For example, a department of literature might house the school of information and library science; or, a department of education might also include disciplines such as philosophy or home economics under its umbrella. Still, in spite of these classification complications, it is clear that a large percentage of university departments publish kiyo, and it is through these publications that various academic disciplines are being represented in the IRs. This is especially noteworthy for the humanities (and some social sciences), which are often found to have low deposit numbers in IRs, but are, in fact, very well represented in the kiyo publications and, consequently, Japanese institutional repositories. This contrasts with the United States, in which a recent study by Ronald Jantz, indicated that IR deposits among ARL libraries shows great variation across disciplines, and is especially lacking in humanities scholarship, particularly history, English and linguistics (Jantz & Wilson, 2008). As Jantz was also careful to point out, this lack of content does not necessarily reflect a lack of user interest or need, and this observation appears to be supported in the case of Japan. Based on the JAIRO Usage Analysis statistics for Japan's newly launched IR portal, the most frequently accessed contents were found to be kiyo articles - logging 3,407 downloads in the first month (513 from the English portal), followed by journal articles with 2,087 accesses (282 from the English portal) (National Institute of Informatics, Nov 18, 2008). For more detail, see Table 4 below.

Table 4: Type of Content Accessed in JAIRO

JAIRO Usage Statistics (Accessed: 11/21/08)

Categories (top to bottom):
- Others
- Software
- Data/ Dataset
- Learning Material
- Preprint
- Article
- Research Paper
- Technical Report
- Book
- Presentation
- Conference Paper
- Kiyo (Dept Bulletin)
- Thesis/ Dissertation
- Journal Article

Legend: □ English Portal ■ Japanese Portal

X-axis: 0, 1000, 2000, 3000, 4000

While it is difficult to place too much weight on these early statistics, an examination of the top-ten accessed kiyo articles reveals that they are all papers in the social science and humanities disciplines, including: English literature, history, economics, art, tourism studies, archeology, French economic history, as well as others (National Institute of Informatics, Nov 18, 2008). Some similar results were also found in a 2006 IR study at the University of Wollongong, Australia, in which a high proportion of the most frequently downloaded papers were written by faculty in the history and art departments (Organ, 2006). There is, of course, an unfortunate disconnect when some of the most frequently accessed articles are amongst the very resources which are least likely to be deposited in IRs, and perhaps the prevalence of Japanese kiyo in these subject areas will help respond to some unmet user needs. In doing so, perhaps it will also

facilitate the reform of Japanese humanities and social sciences as targeted in the 2002 MEXT report. One can certainly hope.

In returning our attention to Japanese IR content, a similar interest emerges as to what type of articles and disciplines are most likely to be found in the journal article category – the second most prevalent content in Japanese IRs. An examination of the 10 most accessed journal papers in JAIRO's Usage Analysis site indicates that articles in the fields of economics, mathematics, computer science, medicine, environmental science, library science, property law, and a paper on American social history have received the most hits over a one-month period (National Institute of Informatics, Nov 18, 2008). Not surprisingly, many of the represented disciplines are those which are typically found in repositories, and have a history of sharing their research in an online database. Many of these disciplines, especially those of science, technology, medicine, as well as law and economics, also tend to publish at the national journal level, rather than in Japanese kiyo (Kamada, 2007). While kiyo do exist for these disciplines, Japanese publication practices in these areas have evolved much differently than those of the humanities and some social sciences. Because research in these disciplines tends to have practical application and international value, the scholarly publications in these areas have generally followed more rigorous standards and the peer-review system plays a more prevalent role (Kamada, 2007). The one outlier of the group, of course, is the American social history paper. A closer look, however, reveals that this paper was written in English for a foreign journal. Given that scholars in many of the science, technology and medical fields similarly pursue publication of their articles in foreign journals as a means of

appealing to an international audience, it seemed worthwhile to examine the extent of

English language content within the journal article category as well as Japanese

institutional repositories as a whole.

Interestingly, it appears that language is indeed an indicator of the type of content

it represents, and is perhaps another area which highlights differences across international

publishing models. Not only are there a significant number of IR journal articles written

in English, but the English-language journal articles outnumber those which were written

in the native language of Japanese (National Institute of Informatics, November 31,

2008). Moreover, these findings are in contrast with the language distribution of kiyo

bulletins - the more dominant resource within Japanese IRs. Unlike journal articles, kiyo

articles tend to be written in Japanese, and once again highlight the internal and

institutional focus of this media, as well as the suggested language variation which is

likely to exist between some of the disciplines (see table).

Language Distribution: Journal Articles and Kiyo
NII IRDB Contents Analysis (Accessed:10/19/08)

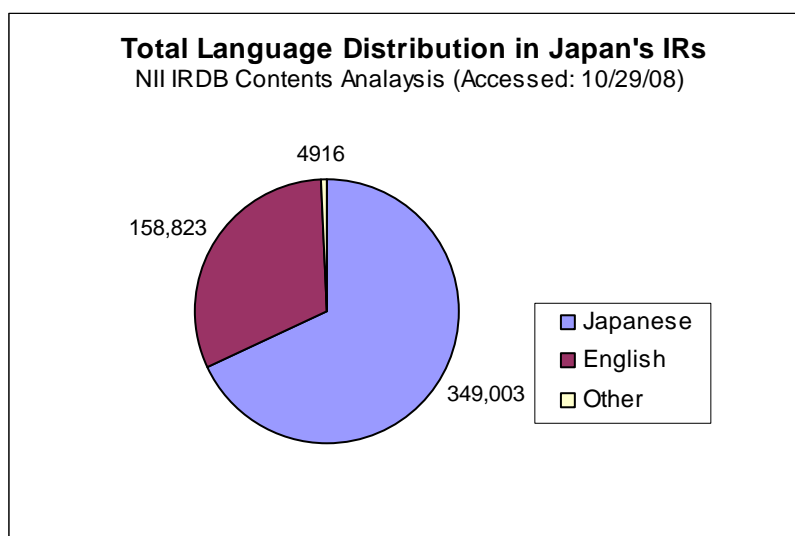| Category	English	Japanese
Kiyo (Dept Bulletin)	40,525	146,406
Journal Article	86,248	69,887
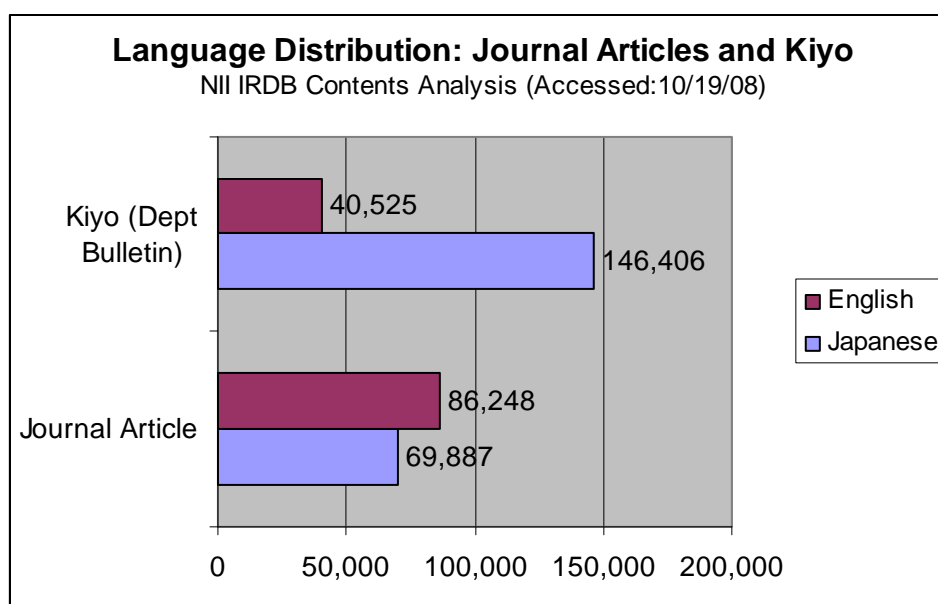
While English is found across most of the resources, there are three areas in which they dominate: journal articles, technical reports and preprints. Each of these materials are well-known academic outputs in other parts of the world, and are a common means of sharing and exchanging information amongst scholars. The preprints and journal articles, in particular, tend to indicate publication through the peer-review system, a practice which still remains more established outside of Japan than within. In fact, the JAIRO numbers indicate that there are only 15 Japanese-language preprints uploaded, as opposed to 134 English language preprints (National Institute of Informatics, November 31, 2008). Aside from language variation, the low numbers also tend to suggest that this type of material may not be recognized as widely in Japan as some other nations.

Given that English-language publication is a dominant characteristic for journal articles and a few other resource items, additionally suggests a differing target and purpose for these materials. As both subject and language knowledge are required for their use, these materials tend to create access barriers for Japanese students and most others, but instead are aimed towards international researchers and colleagues. While their audience within each specific institution is likely to be smaller, these materials are alternately creating a global presence for Japanese institutional repositories, and are serving as a communication bridge for the universal sharing of academic research.

With this in mind, it is interesting to note that foreign language materials account for approximately one-third of the total content in Japanese institutional repositories (see table below). While English is the dominant foreign language, there are, in fact, a total of

31 languages represented across the various Japanese institutions (Cyber Science

Infrastructure Development Department: NII, 2008). The Tokyo University of Foreign

Languages is perhaps the most impressive IR in this category, and has provided access to

multi-lingual documents in Arabic, and various European and Asian languages which can

be searched from a drop-down scroll on the advanced search screen.

Total Language Distribution in Japan's IRs
NII IRDB Contents Analaysis (Accessed: 10/29/08)

4916

158,823

349,003

☐ Japanese
■ English
☐ Other

Still, given the number and variety of universities represented in JAIRO, it can be

assumed that not all institutions are producing heavily in foreign languages. Considering

that journal articles are particularly notable for their wide-spread English publication, this

assumption, in return, leads to speculation on the distribution and representation of this

material throughout the Japanese institutions. Close inspection does, in fact, support a

slightly uneven distribution of journal articles within Japan's IRs. A small group of 11

universities indicate holdings for more than 1,000 journal articles each, and ultimately

represent 26% of the total journal articles within JAIRO. This is in contrast with 18

universities that indicate a complete absence of journal articles, as well as larger group of

36 universities that have holdings of more than 1,000 kiyo articles each. It should be noted, however, that there is one significant outlier amongst the top journal article producers in JAIRO. The Tokyo Institute of Technology, a collaborator in Japan's institutional repositories since 2007, has recently uploaded 100,617 journal articles to their IR, and this institution alone represents 18% of the total 560,478 journal articles in JAIRO as of November 30, 2008 (35,616 journal articles in Japanese and 64,946 in English) – see Appendix B.

This surprising number, of course, gives doubt as to whether the content is full-text, and may instead be an indication of citation information only. Although metadata can provide important research information, the value of open access repositories partly resides on the ability to provide online availability of full-text articles (Xia Jingfeng & Sun Li, 2007). A great number of non-full-text deposits will inevitably reduce the usability of an IR. With this mind, the contents for the Tokyo Institute of Technology were checked, and consequently revealed that none of the journal articles were full-text. Additional information such as an abstract or description also appeared to be missing from the citations, and would have added value had they been present. On a positive note, however, the organization of citations by author and department did provide an excellent means of highlighting and showcasing the scholarship being produced within the institution. The unfortunate problem is that most of the attraction for the user ended there.

With the knowledge that 100,617 journal articles were non-full-text deposits, the

JAIRO statistics and individual university contents were examined in order to get a better

idea of the availability of full-text materials across Japan's IRs. Findings indicate that

61.2% of the 551,808 materials found in JAIRO on October 19, 2008 were full-text

(National Institute of Informatics, November 31, 2008). A breakdown for each of the

materials can be found in Table 7 below.

Table 7: Ratio of Full-text
NII IRDB Contents Analysis (Accessed: 10/19/08)

Category	Ratio
Others	92.4%
Software	25.0%
Data/ Dataset	89.4%
Learning Material	31.7%
Preprint	89.7%
Article	76.1%
Research Paper	58.7%
Technical Report	90.2%
Book	39.9%
Presentation	67.3%
Conference Paper	10.3%
Kiyo (Dept Bulletin)	83.5%
Thesis/ Dissertation	74.1%
Journal Article	28.3%
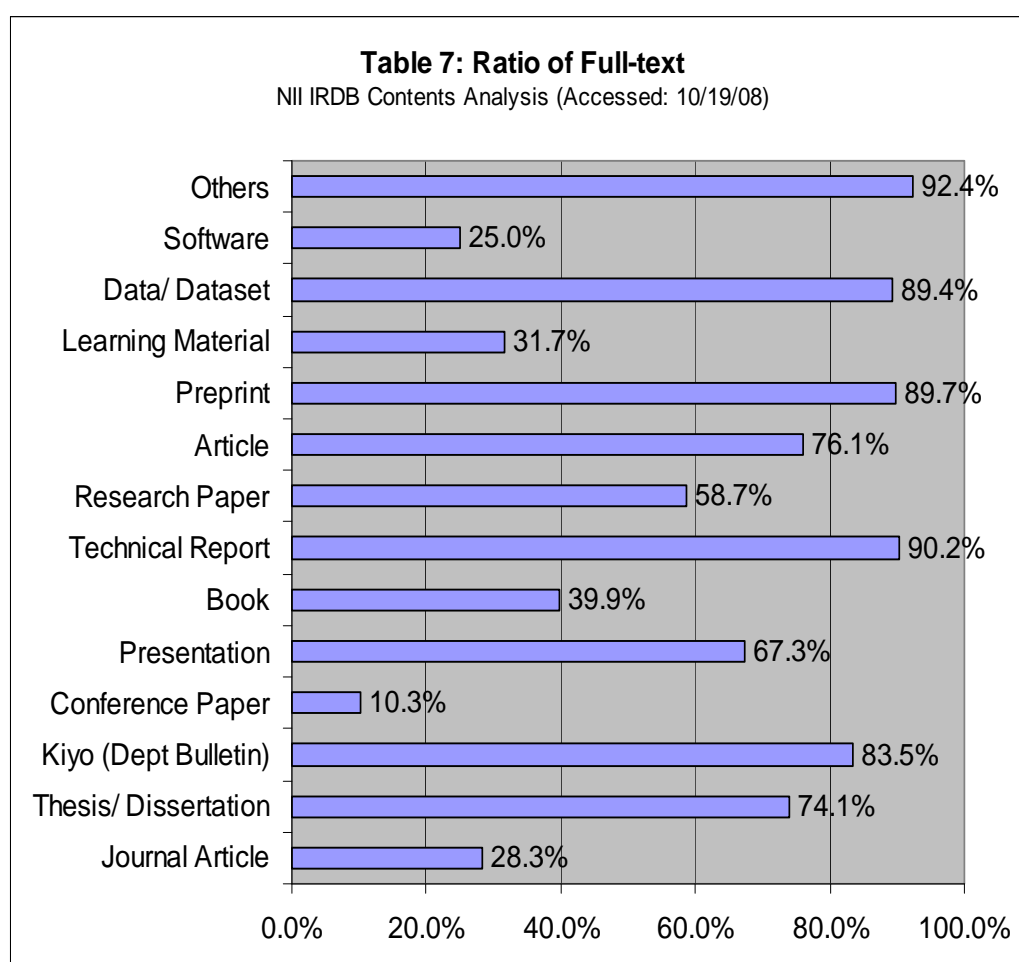
Given the unusually large number of non-full-text journal article deposits from the Tokyo

Institute of Technology, it is not unduly surprising to see that only 28.3% of these

materials are fully accessible to the user. Once again, this is in contrast to kiyo which has much greater full-text access, but is also hampered by the lack of a formal referee system.

Although slightly more than half of the IR contents in JAIRO are available in full-text, it is not entirely clear how this compares to other digital repositories throughout the world. A recent 2007 study conducted by Jingfeng Xia and Li Sun examined nine university IRs, and found that full-text availability may be relatively low outside of Australian repositories. Four out of five European institutions that were studied had markedly low full-text availability (33% or less), while Australian universities achieved rates of full-text availability that were greater than 95% (Xia Jingfeng & Sun Li, 2007). Another recent survey of international repositories, however, suggests that 60% of the books and 72% of the journal articles in their IR sample were fully and openly accessible, with 20.71% of the journal articles being restricted to those connected to the host institution or a specific consortium (*The International Survey of Institutional Digital Repositories,* 2007). Although it is not entirely evident that Japan falls on the low end of the spectrum with regards to full-text availability, there does appear to be room for improvement.

Despite these barriers to full-text access, an examination across all of Japan's IRs only reveals half the picture.   A large scale focus tends to obscure the individual differences and achievements taking place at the local level. When taking a closer look at the contents of each institutional repository, a surprising total of 41 universities are found to be contributing 100% full-text materials. Amongst this group are some significant

contributors with holdings in excess of 4,000 full-text items. These include: Yamaguchi

University (4,112); Niigata University (5,629); Kobe University (6,639); Nagoya

University (7,096); Okayama University (8,243); Waseda University (13,126); Nagasaki

University (14,895); and Hokkaido University (25,378) (National Institute of Informatics,

November 31, 2008). A large number of other universities possess IRs with close to

100% full-text deposits, and most significant amongst these are Chiba University

(21,694) and Osaka University (10,594). Each of these institutional repositories contains

2 items which are not full-text, but are clearly maintaining an operational style which is

focused on open-access (National Institute of Informatics, November 31, 2008).

It is evident from the above numbers that a large amount of content is contained

in Japan's IRs. At present, 51 repositories contain more than 1,000 documents, and from

amongst this group, an additional 16 IRs contain more than 10,000 documents (see

Appendix B). The IR with the largest content, in excess of 100,000 items, is known to

contain metadata only, and is therefore, an outlier in the mix. Given the infancy of

Japan's IR history, these numbers are quite impressive, and appear to differ from the

content numbers of many other IRs around the world. Increasingly, studies are reporting

low content size across IRs, and recruitment is seen as the biggest barrier to the effective

implementation of these systems. In a 2004 issue of *Nature* magazine, Mark Ware found

that the average number of documents in a survey of 45 IRs was only 1,256, most of

which were theses, dissertations or gray literature (Ware, 2004). Another study, by Cat

McDowell followed IR growth amongst 68 American universities, and found that the

average number of items per repository was 2,740, with a median growth rate of one item

per day (McDowell, 2007). In both cases, these numbers are well below Japan's current average of 6,517 items per IR (see Appendix B).

In a few of Japan's IR cases, strong marketing efforts and connection to faculty members have been cited as reasons for strong growth and success. At Ochanomizu University, both university executives and librarians worked together, and achieved deposits from almost 100% of the faculty (Y. Murakami et al., 2007). Similarly Mie University used information literacy courses with faculty as a means of introducing the IR, and subsequently achieved more than 1000 deposits in its first two months.(Y. Murakami et al., 2007)

While not content growth in the true sense, a movement towards regional repositories has also helped some of the smaller universities raise their presence and highlight research efforts taking place in their institutions. Perhaps most notable amongst these efforts is the April 2008 launching of the Hiroshima Associated Repository Project (HARP), an IR consortium for ten regional universities (and eventually one prefectural library), which have joined in a collaborative effort to share and pool resources. At present, the IR contains a total of 903 materials which can be accessed across a federated search, or by individual institution. A similar example of a regional repository is the Yamagata University repository (YOU Campus Repository) whose community extends to eight nearby universities and colleges, which have contributed 562 documents, thus enhancing the 1,457 materials currently deposited by Yamagata faculty.(Cullen &

Nagata, 2008) In both these cases, the combined resources of multiple universities has created repositories with greater content, research potential and benefits for the end user.

A large number of repositories have also enhanced their usability by creating connections between their IRs and various systems both inside and outside the university. For example, Kanazawa University offers an internal connection to its faculty performance database, while also offering multiple external links to JAIRO, copyright websites, and much more. Other sampled universities included links to their library or university websites, external links to Web of Science, ROAR, as well as additional benefits such as RSS feeds and social networking links which greatly elevate the service and utility of their IRs.

While exploring other Japanese university IRs, it was noted that several were quite successful at differentiating themselves through unusual and unique content. This includes Waseda University, where the IR has archived a large collection on the Ainu language and culture as well as documents from Okuma Shigenobu, the founder of the university.(Y. Murakami et al., 2007) Hitotsubashi University has also created a distinctive special collections IR which, along with other content, includes 3704 photographs of "Pre-World War II in Asia" arranged under 53 locations. Doshisha University and Osaka University also include numerous digitized rare materials and visual resources in their IR, including: sketches of noh and kyogen theatre movements; rare bunraku narrative texts; paintings and book collections from early foreign travelers

to Japan; and other historical records which are of value to researchers both within and outside of Japan.

There will undoubtedly be multiple avenues in which the content, service, and usability will be enhanced for Japanese institutional repositories over the next few years. The newly launched web portal, JAIRO, remains a test version at present, and future developments are much anticipated. Having made thorough examinations of the portal and individual repositories, a strongly positive impression has been gained. However, areas of possible improvement did not go completely unnoticed. A general lack of metadata and descriptive information for some digitized visual resources was perceived in a few IRs, and decreased the ability to both find and use these materials. If left unaddressed, this may prove a challenging issue as the IRs continues to grow and develop, and should be an area of concern. Another area of personal difficulty was the inability to consistently verify whether a retrieved article was refereed or not. When using JAIRO's federated search across the IRs, there was a slight concern whether similar policies were being used at each of the institutions, and greater tagging or clearer information regarding peer-review would have proved beneficial to the user. It is possible that these are areas of concern for many libraries and IRs throughout the world, and are not just limited to Japan. While this report focuses on the specific example of Japan's IR development, it is also these areas of shared international challenges, and the various global responses which are an equally important issue to explore.

ONGOING CHALLENGES AND RESPONSES

As previously mentioned, well-documented studies consistently indicate that faculty participation and awareness of IRs is extremely low, and are ultimately resulting in low item population numbers.(Jantz & Wilson, 2008; McDowell, 2007; Rieh, Markey, St. Jean, Yakel, & Kim, 2007; Ware, 2004; Xia Jingfeng & Sun Li, 2007) Judging from the continual growth and relatively large content of Japan's IRs, it may appear that they are immune to this challenge; however, that is not the case. Although there appears to be faculty support at several Japanese universities, in general, what we are seeing is not a large-scale embrace of IR trends and concepts, but rather a benefit derived from an already present in-house publication system. In truth, researchers in Japan have been found to be reluctant about self-archiving their achievements (Y. Murakami & Adachi, 2006). In part, this may be due to the fact that open-access has yet to garner large-scale support, and has never been seriously discussed (Takeuchi & Tutiya, 2007). While there are signatories on the 2001 Budapest Open Access Initiative (BOAI), there is no Japanese presence for the 2003 Berlin Declaration on Open Access, and a JANUL-NII survey indicates that only 29% of Japan's researchers have awareness or understanding of open-access and its significance (Y. Murakami & Adachi, 2006; Takeuchi & Tutiya, 2007). While slightly alarming, these findings tend to corroborate similar studies in other countries, and points to a shared concern for many IRs (Herb & Muller, 2008; Y. Murakami & Adachi, 2006).

Numerous strategies have been implemented to counter this situation around the world, and a recent dominant trend is the establishment of a mandatory deposit policy.

At the institutional level, this requires all faculty members to deposit their publications in the repository with which they are affiliated, and has resulted in significant growth, disciplinary presence, and increased availability of full-text within these IRs (Xia Jingfeng & Sun Li, 2007; Xia, 2007). Examples of universities with mandated faculty deposits include: Harvard University (U.S.); Queensland University of Technology (Australia); and the University of Southampton (U.K.). Despite the enormous success of these initiatives, however, there is hesitancy and concern that this practice "can risk raising ire and hostility to the repository within the academic community"(Johnson, 2007). At present, Japanese institutions have yet to establish this type of mandatory deposit, and similar hesitation may be the primary reason.

An alternate mandate does, however, affect Japanese IRs, and centers on research which is funded by agencies, such as Kakenhi and other grants-in-aid for scientific research. Much like the U.S. mandate on NIH-funded research and the U.K.'s Wellcome Trust mandate, the goals of these policies is to increase the accountability for the use of grant money, and ensure the availability of this research to the general public through open access repositories. Effective from June 2009 (for research ending in 2008), all publically funded research papers will be made accessible online through NII's database known as "Kaken", and will also be cross-referenced to institutional repositories in which these articles are located (Cyber Science Infrastructure Development Department: NII, 2008). The availability and cross-linked access of these funded materials will undoubtedly create visibility potential and prestige for the university IRs, and is another source of added growth.

Another strategy that is being adopted by Japan's IRs, as well as most repositories throughout the world, is a liaison or proxy system through which a librarian or other staff assistant deposits articles on behalf of the faculty (Y. Murakami & Adachi, 2006). This type of mediated deposit has emerged as an efficient and effective practice for increasing the IR population, and counters researchers reluctance to self-archive their work. Increasingly this trend appears to be a favored approach, and has become well-established in the U.K., Australia, and many other parts of the world (Johnson, 2007; Xia Jingfeng & Sun Li, 2007). In addition to proxy registrations, since 2005 most Japanese universities have also introduced mediated copyright permissions in order to further facilitate the growth of their IRs (Y. Murakami & Adachi, 2006). It is, in fact, this particular issue of copyright, and the challenge it creates for authors and repository administrators which poses one of the final barriers to open access repositories all over the world.

While some publishers are clear in stating their rights, the majority of copyright information is not easily found on websites and is often written in incomprehensible legal terms which make the author's rights unclear (Johnson, 2007). In response to this struggle, the partnership of UK institutions known as SHERPA developed the RoMEO Project (Rights Metadata for Open Archiving) at Loughborough University which resulted in a searchable database and knowledge bank of approximately 300 publishers, and includes the conditions they place on self-archiving (Johnson, 2007). This has proved an indispensable reference service for the global IR community, and has been

credited with raising public awareness and placing political pressure on publishers due to its color-coded ranking system (Herb & Muller, 2008).

Much like other countries, researchers in Japan face equally unclear copyright policies, as well as case-by-case processing amongst small publishers. In order to address this issue, a Japanese version of the RoMEO project was designated as one of the 22 research and development projects assigned by NII in 2006 (Y. Murakami & Adachi, 2006; Tomita, 2007). Tsukuba University and the Japan Association of National Libraries (JANUL) worked together to construct copyright policies for Japanese publishers, and launched a website and database for the Japanese academic community known as SCJP (Society Copyright Policies in Japan) (SCPJ, 2008). Currently four university libraries are responsible for the ongoing maintenance of the project, and include: Tsukuba University, Chiba University, Kobe University, and Tokyo Institute of Technology.

Copyright issues continue to be an ongoing challenge in Japan, but one which is increasingly moving towards communication and collaboration. In 2007, a comparison of the SHERPA/RoMEO and SCJP sites indicated that 58% of the Japanese publishing societies did not support self-archiving practices, as opposed to only 25% of the large international publishers (Tokizane, 2007). Despite this enormous gap, however, reports from within the last year have been increasingly positive and point to progress being made through J-Stage, host of more than 200 journals, and NII-ELS, provider of national society journal articles. In part, this progress appears to be connected to NII and SPARC

Japan Partners ongoing efforts to communicate with academic societies and develop

policies which are more favorable for institutional repositories. The ability to achieve

these results, however, may be largely due to the fact that both services are largely

subsidized by the government, and unlike publishers in the United States, the English

journal publications in Japan are not always operating on a 'for-profit' basis (Hayashi,

Wada, & Kubota, 2008; Takeuchi & Tutiya, 2007). While it is difficult to assume that

copyright challenges will disappear in the near future, positive strides are being made in

the online and open access environment within Japan.

CONCLUSION

Despite numerous indications of rapid and large-scale growth related to Japanese

institutional repositories, very little has been written in the library literature, and it was

the hope of this study to address this oversight and examine both the domestic and

international contexts in which this phenomenon is occurring. On numerous levels, many

of the incentives and challenges for building and maintaining IRs are notably similar

throughout the world. Only on closer examination is light shed on some of the differing

responses and national contexts. A look at the Japanese case highlights initiatives and

support from high levels of the government and NII, as well as extensive collaboration

across IRs in the form of research projects and emerging partnerships. An examination

of the searchable content of these IRs similarly reveals striking characteristics of

Japanese academic scholarship, and emphasizes a long-standing internal publishing

culture, which is proving complimentary to IR growth, and is equally enhanced by its

own movement to a digital environment and renewed potential for reform. While it is not

entirely clear that current levels of growth and interest can be maintained throughout the

long-term future, all current indications seem very promising and suggest some varying

environments and practices under which open access to scholarly information can be

achieved

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APPENDIX A: Global Ranking of Japanese IRs (4th Worldwide)

Proportion of Repositories by Country
Worldwide

United States (324 = 25%)
United Kingdom (140 = 11%)
Germany (130 = 10%)
Japan (70 = 5%)
Australia (60 = 5%)
Netherlands (45 = 4%)
Canada (44 = 3%)
Italy (44 = 3%)
[61 Others (420 = 33%)]

OpenDOAR 18-Nov-2008   Total = 1277 repositories
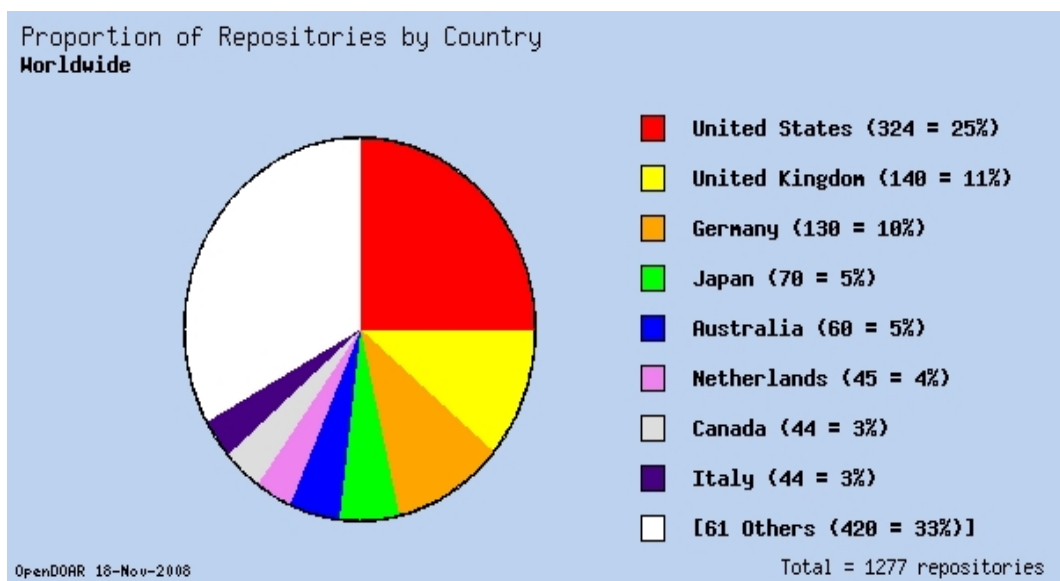
Open Door: Directory of Open Access Repositories
http://www.opendoar.org/ (retrieved: 2008/11/18)
University of Nottingham, UK

Repositories by Geographic Country

United States (252)   United Kingdom (128)
Germany (97)   Japan (60)
Brazil (60)   Canada (46)
France (44)   Spain (44)
Italy (40)   India (39)
Australia (39)   Sweden (35)
Netherlands (24)   Russian Federation (20)
Belgium (18)   Portugal (14)
New Zealand (13)   Denmark (13)
Taiwan (12)   South Africa (11)
Greece (11)   Colombia (10)
Malaysia (10)   China (10)
Peru (9)   Switzerland (8)
Ireland (8)   Mexico (8)
Hungary (8)   Venezuela (7)
Norway (7)   Finland (6)
Commercial (6)   Ukraine (6)
Turkey (6)   Poland (6)
Chile (6)   Austria (6)

Registry of Open Access Repositories (ROAR)
http://roar.eprints.org/ (retrieved: 2008/11/18)
Tim Brody <tdb01r@ecs.soton.ac.uk>, University of Southampton, UK

APPENDIX B: Japanese Organizations with Institutional Repositories

JAIRO: November 30, 2008

Organizations	Total Items	Journal Article	Kiyo	% Kiyo
Akita University	1,088	248	795	73.07%
Ashikawa Medical College	1,404	1,380	2	0.14%
Chiba University	21,694	12,847	5,240	24.15%
Doshisha University	10,051	13	9,604	95.55%
Fukushima University	838	0	833	99.40%
University of Fukui	928	370	539	58.08%
Gunma University	2,931	635	1,165	39.75%
Gifu University	7,370	4	3,470	47.08%
Hamamatsu School of Medicine	50	0	0	0.00%
Hirosaki University	552	9	454	82.25%
Hiroshima Bunkyo Women's	101	0	97	96.04%
Hiroshima City University	115	73	8	6.96%
Hiroshima Inst of Technology	68	13	25	36.76%
Hiroshima International Univ	29	1	27	93.1%
Hiroshima University	16,834	1,721	7,442	44.18%
Hiroshima Univ of Economics	96	0	93	96.88%
Hiroshima Kokusai Gakuin	78	0	78	100.00%
Hitotsubashi University	14,169	312	12,257	86.51%
Hitotsubashi Special Collections	5,094	0	0	0.00%

Organizations	Total Items	Journal Article	Kiyo	% Kiyo
Hokkaido University	25,378	2,690	21,915	86.35%
Hokkaido Univ of Education	782	0	781	99.87%
Hosei University	1,670	28	789	47.25%
Hyogo Univ of Teacher Educ.	998	35	799	80.06%
Univ of Hiroshima Jogakuin	37	0	25	67.57%
Ibaraki University	626	4	463	73.96%
Iwate University	1,747	2	1,651	94.50%
Inst of Dev Economies JETRO	634	241	0	0.00%
Japan Adv Inst of Sci & Tech	3,496	727	0	0.00%
Japan Red Cross Hiroshima	100	0	100	100.00%
Jikei Univ School of Medicine	1,736	745	0	0.00%
Kagoshima University	4,571	66	4,310	94.29%
Kanazawa University	10,212	1,905	6,153	60.25%
Kanto Gakuin University	523	0	501	95.79%
Keio University	12,827	5,582	1,892	14.75%
Kinki University	533	0	479	89.87%
Kitami Institute of Technology	926	177	682	73.65%
Kobe University	6,639	519	5,703	85.90%
Kochi University	405	0	0	0.00%
Kochi University of Technology	244	31	89	36.48%
Kokushikan University	3,063	0	2,930	95.66%
Kumamoto University	5,577	151	4,780	85.71%

Organizations	Total Items	Journal Article	Kiyo	% Kiyo
Kure University	27	0	27	100.00%
Kwansei Gakuin University	270	4	253	93.70%
Kyoto Institute of Technology	564	77	0	0.00%
Kyoto University	40,096	9,097	21,601	53.87%
Kyushu Institute of Technology	831	406	60	7.22%
Kyushu University	9,441	427	7,704	81.60%
Natl Inst Fit & Sports Kanoya	460	0	460	100.0%
Meiji University	103	0	102	99.03%
Mie University	6,446	785	3,410	52.90%
Muroran Institute of Technology	351	74	259	73.79%
University of Miyazaki	1,061	225	756	71.25%
Nagasaki University	14,895	1,596	5,289	35.51%
Nagoya Institute of Technology	152	0	0	0.00%
Nagoya University	7,096	1,667	5,036	70.97%
Nara Institute of Science & Tech	3,563	1	0	0.00%
Nara University of Education	598	48	372	62.21%
Nara Women's University	396	11	179	45.20%
Niigata University	5,629	944	4,165	73.99%
Ochanomizu Univeristy	17.869	475	4,274	23.92%
Oita University	9,281	28	1,079	11.63%
Okayama University	8,243	417	330	4.00%

Organizations	Total Items	Journal Article	Kiyo	% Kiyo
Onomichi University	163	3	152	93.25%
Osaka Kyoiku University	1,564	189	978	62.53%
Osaka University	10,594	5,730	2,599	24.53%
Otaru University of Commerce	1,199	337	787	65.64%
Ritsumeikan University	63	53	0	0.00%
University of the Ryukyus	3,827	237	2,875	75.12%
Saitama University	2,355	974	393	16.69%
Shimane University	4,309	18	4,262	98.91%
Shinshu University	1,095	898	172	15.71%
Shizuoka University	2,328	793	1,084	46.56%
University of Tokyo	11,571	312	8,465	73.16%
Tohoku University	28,201	958	9,901	35.11%
Tokyo Dental College	492	85	365	74.19%
Tokyo Gakugei University	3,839	17	1,501	39.10%
Tokyo Institute of Technology	145,373	100,617	69	0.05%
Tokyo Univ of Foreign Studies	1,755	456	1,189	67.75%
Tokyo U of Marine Science Tec	477	0	327	68.55%
University of Toyama	2,297	881	1,289	56.12%
University of Tsukuba	19,958	889	11,333	56.78%

Organizations	Total Items	Journal Article	Kiyo	% Kiyo
Utsunomiya University	3,188	65	668	20.95%
Waseda University	13,128	234	5,774	43.98%
Yamagata University	2,015	190	1,574	78.11%
Yamaguchi University	4,112	591	3,156	76.75%
Yokohama National University	2,980	377	2,415	81.04%
Sum	560,478	161,725	214,437	38.26%