Scholarly Communication in Mongolia and the Creation of a Knowledge-Based Economy

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Acknowledgements: This paper received valuable comments at the 2010 Association for Asian Studies Conference and from two anonymous reviewers. Generous funding to conduct this research was provided by the American Center for Mongolian Studies and by the Elizabethtown College Faculty International Studies Seminar.
Establishing sustainable economic growth within a developing country requires the presence of a strong research infrastructure. The research infrastructure within a country is strengthened as researchers both within as well as outside the country collaborate with each other. The collaboration of researchers has been aided within developing countries with the adoption of electronic scholarly communication initiatives. While there have been numerous investigations of the use of electronic journals and databases in developing countries, there has been a woeful lack of investigation of the value and use of these information tools in any specific developing country. Moreover, few studies deal specifically with the scholarly communication needs of the research patron and how these needs reinforce or counteract the needs of researchers. With the belief that not all developing countries are alike and that the scholarly communication needs of researchers often differ from the needs of research patrons, we assess the value of different forms of access to electronic scholarly communication. More specifically, our concern is whether donated access or open access to scholarly communication is best suited to meet the needs of researchers, librarians, and research patrons. Our assessment reveals that with respect to creating sustainable economic growth through the application of research, open access scholarly communication initiatives possess the highest potential benefit from the perspective of the researcher, and furthers economic growth goals.

Keywords: Mongolia, scholarly communication, economic growth

1. Introduction:

Long a socialist country aligned with the Soviet Union, Mongolia has been engaged in a rocky transition away from central planning since 1990. Although short-run economic problems that were encountered shortly after the fall of the Soviet Union such as high inflation and food shortages have been alleviated, the country now finds itself facing the significant challenge of how to reduce its reliance on natural resource extraction as a source of economic growth and replace it with economic growth fueled by the application and utilization of knowledge. However transitioning an economy away from resource extraction and towards the application of knowledge is a challenge that is not often met – a phenomenon known as the natural resource curse.

Despite the formidable nature of overcoming the natural resource curse, Mongolia over the past several years has embarked on an agenda to improve higher education and increase research capacity within the country and, over time, achieve economic growth through the application of knowledge. Increasing research capacity within the country has been partly
satisfied by a dramatic improvement in access to scholarly communication over the past decade with the availability of scholarship in many disciplines rivaling that of research universities in developed countries. Access to scholarly communication initiatives has been provided via a combination of donated access and open access. In the case of donated access, publishers extend access to researchers in developing countries at little to no cost and pay for it with revenue captured from research institutes in the developed world. In the case of open access, researchers worldwide receive access at no charge. While donated access and open access to the electronic scholarly communication literature has expanded the availability of scholarship in developing countries, very little research has been devoted to which type of access meets the needs of researchers and their patrons and satisfies economic growth objectives. In this paper, we assess electronic scholarly communication initiatives that are available through both donated and open access and conclude that the needs of researchers and their patrons and economic goals are best satisfied with open access scholarly communication initiatives.

2. Mongolia – A Country in Transition

In Mongolia, the decades-long transition from a centrally planned to a market economy has been accompanied and aided by a transition in the country’s research and education infrastructure. In this section we provide an overview of the transitions in the Mongolian economy, the education and research system in Mongolia, and the global transition in the scholarly communication process.

2.1 Transitions in the Economy:

With the fall of the Soviet Union, Mongolia began its transition from a centrally planned to a market based economy. Prior to 1990, nearly 80% of Mongolian trade was with the Soviet Union with the primary exports from Mongolia being agriculture and minerals and the primary imports to Mongolia being fuel, medicine, and machines.\(^1\) During the 1990s, with the liberalization of trade and privatization of state enterprises, the Mongolian economy faced

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\(^1\) An excellent early piece that documents the economic challenges faced in Mongolia is found in Asian Development Bank (1992).
significant challenges as Soviet subsidies ceased (subsidies that in the 1980s represented nearly 1/3 the country’s gross domestic product). ² The early 1990s represented a particularly turbulent time in the transition with triple digit inflation, high unemployment, and shortages with economic output falling by a third.³

Although the prospects for economic growth would not seem immediately apparent for a developing country that was for so long under the tutelage of the Soviet Union, the Mongolian economy over the past few years has been among the fastest growing in the world.⁴ And it is the fact that much of the economic growth in the country comes from natural resource extraction is what has raised concerns about the emergence of the natural resource curse. The natural resource curse, or the paradox of plenty, is a description of the tendency of countries with an abundance of non-renewable resources to eventually have lower economic growth rates and worse development outcomes than countries that lacked such resources.⁵ The reasons for this relationship between natural resource extraction and economic growth are varied and include reduced competitiveness of the export sector as the exchange rate rises (due to foreign demand to buy the natural resource), the potential for inefficiencies as the government establishes an ownership claim over the resource, and the crowding out of the manufacturing sector as the country focuses on resource extraction.⁶ Given the eventuality of the natural resource being exhausted and economic growth falling, economic authorities in a developing country often focus on creating the conditions for sustainable growth. This is sustainable growth that is achieved by building up a knowledge-based economy that relies on a country’s educational and research resources to train workers and provide the skills needed for the production of highly valued goods and services. In the case of Mongolia, the infrastructure that underlies the education and research system needs to be reformed.

2.2 Transitions in the Educational and Research Infrastructure:

² The dependency that the Soviet subsidies created in the Mongolian economy is briefly discussed in World Vision (2009)
³ The significant contraction in economic performance in the early 1990s in Mongolia is documented in Marshall, Nixson, and Walters (2004), 5-6.
⁴ The economy grew over 6% in 2010 with a broad based recovery from a slight 1.3% contraction in 2009 and has averaged 9% a year dating back to 2004. World Bank (2011), p. 29.
⁵ The curse was first postulated by Auty (1993) and later summarized by Frankel (2010).
The transition in the economy towards a market-based approach has required investments in the country’s educational and research infrastructure. So as to encourage the production of high quality and innovative goods and the delivery of services, the revenue from resource extraction can be directed to investments in human capital and the country’s education and research infrastructure. That such an investment is needed in education is evidenced by the fact that in a survey of firms of what factors constrained economic growth, over 50% of firms cited a lack of skilled workers as a constraint to growth. Even when a position was filled, firms complained about their employee’s lack of English-language and technical skills, insufficient managerial skills, and an inability to work in teams.

The investment in the country’s educational and research infrastructure is not just about the size of the investment. Rather, it is more about reforming the infrastructure. The education system is seen as needing to be reformed such that instruction in traditional subjects and memorization is de-emphasized. Also, rather than expanding the number of higher education institutions, in Mongolia the current problem is too many institutions. With 160 private and public institutions of higher education and a population of only 2.6 million, the number of higher education institutions per 1000 people is 8 times that of Japan, 10 times that of South Korea, and 103 times that of Thailand. Although private institutions represented over 70% of the number of institutions, they serve only 1/3 of higher education students. These private institutions specialize in law, business, and the social sciences but have dubious quality with most failing to meet accreditation standards.

Besides reforming the education system, there have been active efforts to reform the research infrastructure in Mongolia. The government is the primary patron of research with research activities organized largely by the Mongolian Academy of Sciences (MAS). The MAS supervises 17 research institutes and centers that date back to 1921. Each of these institutes and centers has a journal that is published on at least a yearly basis. The MAS is also

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7 Human capital represents the skills and knowledge acquired through education and experience that leads to workers being able to design, market, manufacture, and sell innovative goods and services. This theory is extensively outlined in Becker (1993).
8 Extensive surveys of business leaders was conducted in Asian Development Bank (2009), 19-20.
10 Ibid.
11 A brief description of the Mongolian Academy of Sciences can be found at http://www.mas.ac.mn and at www.interacademies.net/ByRegion/SouthEastAsiaPacific/Mongolia/13499.aspx. These government agencies are also discussed in Ministry of Education, Culture, and Science (2007), p. 41-43.
affiliated with 9 scientific production corporations (with names such as Renewable Energy Corporation, Mongolian Center for Technology Transfer, and the Mongolian Agriculture Engineering Corporation). The influence of the MAS as the country’s research institute is complemented by the more recently established Mongolian Foundation for Science and Technology. This organization, established in 1993, is a government research organization that funds some basic research (about 25% of spending) but focuses overwhelmingly on applied and innovation research projects.

The national research system in Mongolia has been in active transition since 1997. Although throughout the 1990s the number of researchers was reduced, in 1997 the reforms to the system went even further as research and development units were either merged with universities or asked to become self-financing and required to be responsive to emerging needs of the private sector. Although by law scientific research is designated to receive 1.5% of gross domestic product, only 20% of that amount has been allocated over the past decade. Reforming the research infrastructure in Mongolia however has gone beyond a recognition that more research funding is needed. The transition Mongolia’s research system is undergoing is one where the government encourages researchers to competitively apply for research funding, views the private sector as a valuable site for conducting research, and sees its role more as one of establishing research priorities (priorities that are currently in the areas of information technology, traditional technology in agriculture, biotechnology, chemical technology, and metallurgical and machinery technology) than providing funding.

2.3 The Global Transition in the Scholarly Communication Process:

Accompanying the dramatic changes in Mongolia’s economy, education system, and research infrastructure has been a global transition in the scholarly communication process. The scholarly communication process is important because it serves as a critical coordination tool in the research process by ensuring that the duplication of research activities is kept to a minimum. The process also serves to rank-order the value of contributions made by researchers by having

\[12\] Ibid.
\[14\] These priorities were indicated in conversations with officials at the Mongolian Academy of Sciences and is reiterated on their website.
editors and peers selectively place the research of others in journals of varying quality. Research published in scholarly journals is used to produce more theoretical research as well as used by those in industry who are engaged in applied research.

Over the past two decades the distribution of scholarly literature worldwide has been transformed in nearly every discipline from a paper medium to an electronic medium. The consequence of this change in the medium has been a complete alteration in how scholars interact with and contribute to the scholarly literature. In the beginning of the electronic era of scholarly communication there emerged a division between scholarly communities in developed countries and those in developing countries. Throughout the 1980s and 1990s, scholarly communities in developed countries began to access the scholarly literature through publisher-provided electronic databases. Scholars in developing countries, on the other hand, continued to receive their limited access to the scholarship through print journals and indexes. Access to the scholarly communication literature improved somewhat in the latter 1990s with the extension of Internet access to developing countries and the availability of author-posted manuscripts and the proliferation of free of charge electronic-only journals. However, at the close of the twentieth century there remained significant hurdles to scholars in developing countries receiving access to publisher-provided electronic journals and databases with the challenges being cost and availability of technology.

Access to scholarly communication initiatives in developing countries has been achieved through donated access and open access. Donated access is defined as free or low-cost access to journals and databases that is made available by publishers through charitable programs or targeted funding from government and philanthropic organizations. The environment for access to the scholarly literature changed starting in 2001 when a number of publishers began to donate access to their costly databases so as to deflect mounting criticism from many that a digital divide existed in scholarly communication – a divide in access to knowledge that perpetuated the divide in economic development across countries. Donating access to scholars in developing countries was also facilitated by the fact that technology had made it possible offer access at little cost.

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15 An overview of this transition is provided by Bohlin (2004).
16 The issues faced in developing countries with respect to scholarly communication is provided by Arunachalam (2003).
17 Kirsop and Chan (2005) provide an overview of donated access and open access scholarly communication initiatives in developing countries.
to no additional cost.\textsuperscript{18} Examples of donated access to electronic scholarly communication initiatives include AGORA (Access to Global Online Research in Agriculture), OARE (Online Access to Research in the Environment), and HINARI (Access to Health Research). AGORA, OARE, and HINARI are funded by various programs within the United Nations and contain articles from 11,200 journal titles that are available through free access channels as well as articles from traditional journals. Other donated access scholarly communication initiatives include the International Network for the Availability of Scientific Publications (INASP) and Electronic Information for Libraries (eIFL) where consortia of institutions within the developing country are formed and bundles of journal titles are licensed to them.

Open access is defined as free access to research either as individual manuscripts in institutional repositories or articles in electronic journals.\textsuperscript{19} Open access electronic scholarly communication initiatives include PubMed Central, Directory of Open Access Journals, Directory of Open Access Repositories, Free Medical Journals Program, and arXiv. Open access scholarly communication projects often rely on small institutional, government, or author subsidies in order to make access free to all.\textsuperscript{20}

With a realization that the scholarly communication process plays a critical role in the research process and that the type, quality, and quantity of research outputs is influenced by the type, quality, and quantity of scholarly communication inputs, in the next section we describe the scholarly communication process in Mongolia. In this description of the types of scholarly communication objects relied upon by Mongolian researchers, we devote particular attention to the open and donated access options available.

3. The Scholarly Communication Process in Mongolia:

Over the next three sections we describe the current use of scholarly communication objects by Mongolian researchers and, with a belief that scholarly communication objects play

\begin{itemize}
\item \textsuperscript{18} Silver (2002) also noted that extending access to developing countries was a good public relations move and allowed the publisher to establish an early presence in an emerging market.
\item \textsuperscript{19} The literature on open access scholarly communication initiatives is extensive. Three particularly relevant pieces include Harnad et. al (2004), Bo-Christers (2004), and Willinsky (2003).
\item \textsuperscript{20} The challenges of financing open access scholarly communication initiatives are substantial. An overview of these challenges is provided by Chang (2006) and Cockerill (2006).
\end{itemize}
an integral role in bringing about the type of economic growth Mongolia needs, assess the types of scholarly communication initiatives that should exist in the future. This assessment is accomplished in two fashions. First, we apply an assessment developed by Kirsop et. al (2007) where donated and open access scholarly communication objects are compared via several criteria. Second, we engage in a series of interviews with researchers, librarians, and research administrators to assess qualitatively what research and patronage needs are being unmet.

This multi-faceted assessment of scholarly communication is important because in many developing countries, Mongolia included, the problem of availability of electronic scholarly communication initiatives has been largely addressed over the past decade. Today, the resources available to those in developing countries rival those at major research universities in the developed countries. A multi-faceted assessment allows us to consider which types of initiatives, those donated or those openly available to all researchers free of charge, is financially sustainable over the long run, meets the needs of researchers and patrons, and deals with lingering challenges that are commonplace in developing countries such as technology familiarity, a slow to develop research culture, and a lack of specialized library services skills.

The scholarly communication process in Mongolia has been slow to change after 1990. To begin, the scholarly communication process in Mongolia before 1990 consisted of researchers, almost all of whom were trained in a Soviet tradition and as such, largely publishing in Mongolian or Russian. Their publications were either associated with their employer (a ‘house’ journal or a text published by a local press) or published abroad in a socialist-aligned country. With a largely domestic scholarly communication process participated in by researchers primarily affiliated with research institutes and centers, researchers could publish domestically without sacrificing their career and needed only to collaborate abroad with scholars from other Soviet-aligned countries. Mongolian research focused on agriculture and natural resources with the humanities and social sciences relegated to a lower status as the Soviet Union repressed Mongolian history and culture in favor of the instruction of socialist ideals.

Since 1990 Mongolian researchers have increasingly been encouraged by their patrons to rely on and contribute to the worldwide peer reviewed literature in their field. There remains, especially among the older generation of scholars, a lack of appreciation of the different rankings of journals and of the importance of peer review. Although the youngest generation of researchers in Mongolia are aware of the importance of relying on and contributing to the peer
reviewed literature, many of these researchers have made a choice to devote their time to commissioned research. Despite the focus on commissioned research which is quite often unpublished, Mongolian researchers have made more contributions to the body of scholarly literature as documented by Scopus, a bibliographic database that covers 18,000 journal titles (16,500 of which are peer reviewed):

![Figure 1: Number of Publications by Mongolian Scholars](source: Scopus. www.scopus.com/home)

Thus researchers in Mongolia are increasingly producing research that is available and of value to a worldwide audience.

The research published by Mongolians is infused with and shaped by the published research conducted by others. The body of scholarship available to researchers increased dramatically in 2001 when several academic libraries in Mongolia, through their membership in eIFL, were offered free access to the EBSCO database. After this free trial period ended, Mongolian academic libraries however were unwilling to pay for access. Access to donated electronic scholarly communication initiatives resumed in 2004 after eIFL again offered access in developing countries. Researchers in Mongolia were given access to six different databases (BioOne, Cambridge University Press, Institute of Physics Publishing, Oxford English Dictionary, Oxford Reference Online, and Oxford University Press). Notably absent from this list was the EBSCO database. Access to the electronic scholarly communication process in Mongolia through donation expanded in 2007 as libraries gained access to more popular

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21 According to Hirshon (2002), this access was valued at $20,000 and was paid for by the Mongolian Foundation for Open Society.
databases such as JSTOR and EBSCO. The expansion in access to electronic scholarly communication initiatives through donations has been prompted, in part, by the formation and strengthening of library consortia. Researchers in Mongolia also have access to the aforementioned HINARI, AGORA, and OARE databases. The donated access to the scholarly literature is complemented by the same open access scholarly communication initiatives that are available to researchers around the world. The significant investment in desktop computers and Internet connections has meant that more researchers have open access scholarly communication initiatives available to them.

With both donated access and open access to the scholarly literature existing in Mongolia, it becomes important to determine which form of access best meets the needs of researchers and their patrons and furthers the goal of sustainable growth. In the next two sections we employ two means of assessing donated and open access initiatives. The first method of assessment appeals to quantitative measurement via criteria and was first devised by Kirsop et. al in 2007. The second method of assessment is more qualitative and consists of a series of interviews with researchers, librarians, and research administrators.

4. Assessment of Donated and Open Access Scholarly Communication Initiatives in Mongolia by Criteria:

Kirsop et. al (2007) engage in an assessment of donated and open access initiatives in developing countries using the criteria of relevance, access and ease of use, affordability, usage, and capacity building and permanence. To the extent donated and open access scholarly communication initiatives in Mongolia meet these criteria, the needs of research scholars and patrons can be seen as being satisfied. Across these criteria what is seen is that the needs of researchers and patrons are best satisfied with open access scholarly communication initiatives.

4.1 Relevance:

The relevance of an electronic scholarly communication initiative depends on the coverage of the disciplines and the scholarly habits and traditions of researchers. Borchuluun Yadamsuren sought to identify the information needs and information seeking behavior of
Mongolian scholars and found that journals, textbooks, and monographs were the most heavily relied upon scholarly communication devices across scholars overall. She found that there were distinct differences between natural and social scientists as evidenced below:

<table>
<thead>
<tr>
<th>Source</th>
<th>Total Percentage</th>
<th>Percent represented by Natural Scientists</th>
<th>Percent represented by Social Scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional journal</td>
<td>81</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Textbooks</td>
<td>64</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Monographs</td>
<td>61</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Preprints</td>
<td>10</td>
<td>77</td>
<td>23</td>
</tr>
<tr>
<td>Correspondence</td>
<td>41</td>
<td>71</td>
<td>29</td>
</tr>
<tr>
<td>Conference Proceedings</td>
<td>38</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>Conference Attendance</td>
<td>38</td>
<td>64</td>
<td>36</td>
</tr>
<tr>
<td>Newsletters/Bulletins</td>
<td>29</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 1: Sources of Scholarly Information in Mongolia. Yadamsuren (2007), 9.

What we see is that of the various types of scholarly communication objects, journals and preprints are heavily relied upon by Mongolian researchers in the natural sciences. In the social sciences there is greater dispersion in the scholarly communication sources relied upon. With respect to achieving access to the scholarly literature from donations, the challenge faced is that most of what is made available is in the English-language. Thus access achieved through donation is of relevance to only a small set of researchers – those with English language skills, access to computers, and an interest in engaging in the peer reviewed global conversation in their research field. With respect to achieving access to the scholarly communication literature through open methods, published research will be in a greater variety of languages, employ varying degrees of peer review, and publish more than just research articles. Consequently, access achieved through open methods is of relevance to a larger set of researchers.

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22 Yadamsuren (2007).
4.2 Access and Ease of Use:

As is the case in many developing countries, the early years of electronic access to scholarly communication initiatives in Mongolia were hindered by lack of Internet access and lack of training. Most researchers today however have their own computer and the necessary training and 80% of researchers in Mongolia have an Internet connection.\(^{23}\) Although Mongolian researchers are adept in their use of computers and of Internet search engines, scholarly communications databases require some specialized training. This training has been lacking, in part, because the donor providing access or the institution providing open access doesn’t provide sufficient personnel and resources for training. The lack of access is also caused by the fact that academic libraries, where access to donated electronic scholarly communication initiatives occurs, lacks personnel with sufficient technical training.\(^{24}\)

With professional journals being the most relied upon scholarly communication device in Mongolia, Yadamsuren (2007) found that scholars overall relied on a shared access – either through their library or from a colleague. Distinguishing between scholars in the social and natural sciences, social scientists reported more strongly than natural scientists that they obtained their article from a personal print or electronic subscription. Whereas social scientists access the literature in a more isolationist fashion, scholars in the natural sciences rely on the library’s print and electronic version of research.

<table>
<thead>
<tr>
<th>Methods</th>
<th>Percentage</th>
<th>Percent represented by Natural Scientists</th>
<th>Percent represented by Social Scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal subscription to print</td>
<td>15</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>Library’s copy</td>
<td>51</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Photocopy library’s copy</td>
<td>52</td>
<td>49</td>
<td>51</td>
</tr>
<tr>
<td>Subscription to</td>
<td>17</td>
<td>27</td>
<td>73</td>
</tr>
</tbody>
</table>

\(^{24}\) Johnson, Catherine and Borchuluun Yadamsuren (2010).
What we conclude from this is that all scholars are increasingly being provided the resources needed to access the scholarly literature electronically. Natural scientists are more likely to take advantage of donor-provided access since donors limit access to libraries and natural scientists have a tradition of receiving access from their library. Social scientists, on the other hand, will likely take advantage of open access resources given their preference to avoid library access.

4.3 Affordability:

Within Mongolia there is a limited amount of funding available for research with most funding devoted for personnel. Moreover there is no expectation over the ensuing years that there will be financial resources to purchase access to scholarly communication. Mongolian scholars must rely on publishers continuing to make journal titles available and non-governmental organizations continuing to pay for such access and invest nominal sums in creating their own institutional repositories. The lack of funding for scholarly communication gives a clear advantage to open access scholarly communication initiatives. In an increasingly privatized education and research environment, the necessity of paying for access to scholarly communication has been under attack and librarians and the patrons to research remain uncommitted to the notion that paying for access to the scholarly literature is a wise investment.

4.4 Usage:

Table 2: Means of Access to Scholarly Information in Mongolia. Yadamsuren (2007), 11.

<table>
<thead>
<tr>
<th>Means of Access</th>
<th>21</th>
<th>57</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borrow from colleagues</td>
<td>55</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>Library’s electronic version</td>
<td>21</td>
<td>57</td>
<td>43</td>
</tr>
<tr>
<td>Get a copy from colleague abroad</td>
<td>42</td>
<td>62</td>
<td>38</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>57</td>
<td>43</td>
</tr>
</tbody>
</table>
One of the positive consequences to the use of electronic scholarly communication initiatives is the ability to track usage in a detailed fashion. Many publishers that provide donor access to scholarship often impose usage restrictions (such as a limit that no more than 15% of an issue’s contents can be downloaded). Open access to scholarship, on the other hand, imposes no such restrictions. After providing access to electronic scholarly communication initiatives, publishers have had to sort out which statistics were most useful. Is it the case the number of logins, searches, pages of full text articles viewed, and or number of articles printed or downloaded most useful for determining the extent of a resource’s utilization? Hirshon (2002) reports that the most useful statistics are the number of searches and the number of articles viewed or downloaded. The number of logins and number of pages retrieved are among the least useful statistics collected.25

When we look at one of the first donor-provided databases available to scholars in Mongolia, eIFL access to EBSCO in 2001 and 2002, we see growing usage of the resource.

<table>
<thead>
<tr>
<th>Year</th>
<th>Full-Text Articles</th>
<th>Logins</th>
<th>Searches</th>
</tr>
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<tbody>
<tr>
<td>2001</td>
<td>11,196</td>
<td>1,989</td>
<td>8,701</td>
</tr>
<tr>
<td>2002</td>
<td>5,334</td>
<td>4,403</td>
<td>20,349</td>
</tr>
</tbody>
</table>


Initially there was some hoarding of articles by scholars (revealed by the fact that there were a small number of logins that were associated with a large number of full-text articles being accessed). eIFL set the price of providing access to Mongolia at $20,000 (a price paid for during the trial period by the Mongolian Foundation for Open Society). With that price, access to a full-text article was estimated at $1.79 in 2001 and $3.75 in 2002. Compared to the other 41 countries participating in the eIFL trial, Mongolia experienced higher access costs than the average country ($0.86 per abstract in 2001 for Mongolia vs. $0.51 average in 2001 and $6.91 per abstract in 2001 for Mongolia vs. $1.84 average).26 The number of licenses to eIFL-provided

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25 Hirshon (2007) actually emanated from the free access to EBSCO offered by eIFL to numerous developing countries. EBSCO was offered free of charge or at very low cost for 18 months and in exchange EBSCO received detailed statistics that presumably could be used to market the product to institutions.

databases within the country has steadily increased from 3 in 2004, to 5 in 2005, to 6 in 2007. Despite access to a greater number of databases across more institutions, the number of full-text articles accessed has been generally quite low.

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<tbody>
<tr>
<td>2004</td>
<td>7</td>
<td>40</td>
<td>39</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2005</td>
<td>84</td>
<td>304</td>
<td>511</td>
<td>116</td>
<td>237</td>
<td>--</td>
</tr>
<tr>
<td>2006</td>
<td>142</td>
<td>235</td>
<td>1238</td>
<td>38</td>
<td>206</td>
<td>--</td>
</tr>
<tr>
<td>2007</td>
<td>470</td>
<td>403</td>
<td>947</td>
<td>318</td>
<td>76</td>
<td>129</td>
</tr>
</tbody>
</table>

Data collected from eIFL by Gantulga Lkhagva

The usage for each database differs significantly by institution. For BioOne, the majority of accesses made were recorded at the National University of Mongolia. By contrast, for the articles provided by Oxford University Press, the Mongolian Academy of Sciences had the largest number of accesses.

Donor-provided access to the scholarly literature in Mongolia has also come from JSTOR. JSTOR is a scholarly literature database geared towards scholars in the humanities and social sciences and until recently access could only be obtained through the American Center for Mongolian Studies (ACMS). The ACMS, defined by JSTOR as a ‘very small’ institution, according to usage statistics collected had 1,548 articles (2,858 pages) accessed in 2007, 1,810 articles (1940 pages) in 2008, and 975 articles (3763 pages) in the first half of 2009. The heaviest usage is in the disciplines of Business (11.1% of total usage), Political Science (10.6% of total usage), Math (10.3% of total usage), and Biology (9.5% of total usage). In all four of these disciplines, usage at the ACMS was nearly twice as much as at the average ‘very small’ JSTOR institution.

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27 Licenses were held by the Mongolian Academy of Sciences, Mongolian State University of Education, Mongolian University of Science and Technology, National Library of Mongolia, and the National University of Mongolia.
28 From usage statistics collected by Gantulga Lkhagva, of the 470 full-text downloads made in 2007, 380 of these downloads were made at the National University of Mongolia.
29 From usage statistics collected by Gantulga Lkhagva, of the 129 full-text downloads made in 2007, 82 of these downloads were at the Mongolian Academy of Sciences.
30 This data was collected by Thomas Scheiding at the American Center for Mongolian Studies in May 2009.
Two specialized institutions of higher education in Mongolia, the Institute of Finance and Economics (IFE) and the Academy of Management (AOM), have access to some specialized (non-donated) scholarly communication databases. At the IFE (a private institution), EBSCO databases such as Academic Search Premier and Business Source Premier are extensively used. For Academic Search Premier there were 472 searchers from January to July of 2010 across 83 sessions with 259 text downloads. For Business Source Premier there were 1180 searches from January to July 2010 across 315 sessions with 658 text downloads. The most commonly accessed titles were *Harvard Business Review* (representing 130 of the 658 text downloads for Business Source Premier). The second most accessed title was *Library Journal* (representing 69 of the 259 text downloads for Academic Search Premier). The usage patterns at the AOM (a public institution) reveal that there were 911 searches across 229 sessions with 178 text downloads. For the Business Source Elite database there were 559 searches from January to July 2010 across 131 sessions with 88 text downloads. The titles accessed the most within this database indicate some hoarding with three of the top four titles being in the field of public administration. For both the IFE and the AOM there is evidence that that a few scholars are making extensive use of the databases. At both the IFE and AOM, librarians are extensive users of the databases with *Library Journal* being the second most accessed titles at the IFE and the fifth most accessed title at the AOM.

The usage of open access journals and repositories within Mongolia is more difficult to discern. Given the proliferation of networked computers and high-speed Internet access and the lack of spending devoted to accessing the scholarly literature, the use of open access scholarly literature is likely many times that of access to donated access scholarly literature where restrictions are imposed on where research can be accessed and how much can be downloaded. Suber (2007) remarks that we shouldn’t be surprised to see that literature which is easy to find and retrieve would be used and cited more than literature that is harder to find and access. Swan (2010), in a review of 31 studies of the usage of open access initiatives, found that 27 studies indicated enhanced usage whereas only 4 studies found no increased usage. Although only approximately 1/5 of all scholarship is published in an open access form, Dolgin (2009) found that the use of open access initiatives within developing countries is twice that of developed countries. Although lacking Mongolia-specific usage statistics for open access scholarly

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31 Usage statistics were collected by Gantula Lkhagva
communication initiatives, from these studies it is altogether likely that the use of open access initiatives exceeds that of donor-provided access to initiatives.

4.5 Capacity Building and Permanence:

An electronic scholarly communication initiative within a developing country builds up a country’s capacity for scholarship and fosters permanency of a research intense environment when it is aligned with the needs of researchers and their patrons. With donor-provided scholarly communication initiatives there is a complete lack of capacity building and permanence within Mongolia. Donor-provided access provides very little capacity building and no prospect for permanence. Access to high-quality scholarship certainly encourages scholars to contribute to and cite high-quality research from around the world and builds up a capacity for them to make contributions and citations in the future. That capacity however depends on receiving continued access to the journal titles and databases. At any time however the publisher can either elect not to provide access or can alter the resources offered. The donor as well can at any time elect not to provide the funding for access. The lack of permanence of donor-provided access limits the amount of capacity that donor-provided electronic scholarly communication initiatives provide the scholars in Mongolia.

Although scholars within Mongolia have made use of and have cited open access literature available from databases located outside of Mongolia, there are no contributions of journal titles by Mongolian researchers to the open access scholarly literature. Their use without restriction of these open access scholarly communication initiatives certainly expands the research capacity within the country as scholars become accustomed to accessing and citing the scholarship of others. Open access scholarly communication initiatives however still depend on some form of financing. Until a business model for open access scholarly communication initiatives is settled upon, there is no guarantee of permanence for such initiatives (although there is more permanence for open access initiatives than access provided by a donor).

32 There are no open access journals edited and housed in Mongolia whereas other developing countries have a least several open access journals. Developed countries such as the United States as of September 2010 have 1126 open access journals, Brazil has 477 open access journals, United Kingdom has 425 open access journals, and 305 open access journals are in Spain. Source: [http://www.doaj.org/doaj?func=bycountry](http://www.doaj.org/doaj?func=bycountry). Accessed September 6, 2010.
4.6 Conclusions from the Assessment by Criteria:

Using Kirsop et. al’s criteria of relevance, access and ease of use, affordability, usage and capacity building and permanence, both researchers and patrons are currently having their needs met with donated access to the expensive peer review literature that is complemented heavily with open access literature. The demand for peer-reviewed research at this moment in time is low although it is growing. The donated access will give patrons and researchers a needed taste of high-quality peer reviewed research. This access is valuable in that it has encouraged researchers to cite and submit research to publications held in high regard. Although the patron doesn’t necessarily hold research publications as an important research output, the fact that such access is free or inexpensive means that there is only an upside benefit with higher quality research being produced. Given the smaller quantity of research being made available through donation, it is necessary to complement donated access with open access. The quality of the research published in open access outlets rivals that in donated access research outlets and the quantity of research made available exceeds that of donated access. Thus it would seem that open access scholarship is relevant to the needs of researchers (with their patrons indifferent), as accessible and easy to use as donated access, more affordable over the long term than donated access, holds out the potential to be used more than donated access because of the disciplinary coverage, and has a significant advantage over donated access with regards to permanence and capacity building. Based on Kirsop et. al’s criteria, open access scholarship holds a distinct advantage over donated access in regards to meeting the needs of researchers and their patrons.

5. Assessment of Donated and Open Access Scholarly Communication Initiatives in Mongolia by Interview:

Kirsop et. al’s criteria, while instructive for comparing types of scholarly communication initiatives, needs to be complemented with a series of conversations with individuals that are engaged in the dramatic change in the country’s economy and research institutions. The limitation of the Kirsop et. al criteria is particularly apparent when it comes to the developing countries where concerns of the patron for research that can promote economic growth might be overlooked or where the needs of the researcher in a resource constrained environment are
discounted. So as to capture a more complete picture regarding the scholarly communication process in Mongolia we conducted a series of interviews with researchers, librarians, and government officials. In 2010 and 2011 we interviewed the following individuals:

Researchers:
Tuvshintugs Batdelger, Director of the Economic Research Institute and Professor of Economics, National University of Mongolia

Borya Orkhontuul, Deputy Director of the School of Mining Engineering, Mongolian University of Science and Technology

Librarians:
G. Sodgerel, Director of Library, Institute of Finance and Economics

Chakerhaan Gulnar, Director of Library, Mongolian University of Science and Technology

Saranchimeg Davaajantsan, Head of Division of Reading and Service, National Library of Mongolia

Research Administrators:
T. Gan-Erdene, Director, Ministry of Education, Culture, and Science

T. Galbaatar, Secretary General, Mongolian Academy of Sciences

D. Shurkhuu, Scientific Secretary of the Institute of International Studies, Mongolian Academy of Sciences

Budeebazar Avid, Head of Department of Research and Monitoring, Mongolian Academy of Sciences

In our summary of these conversations below, what we are providing are generalizations for each category of individuals and not providing statements attributable to any single individual so as to encourage the free communication of thoughts. The individuals selected we feel represent authorities in these categories and are well aware of the sentiments of those who surround them.

5.1 Researchers:
Among those who conduct research, there were several recurring themes in our interviews. Our discussions were with an economist, historian, and a mining engineer (social sciences, humanities, and natural sciences). In these conversations it was immediately apparent that a generational divide existed with the younger generation of researchers (those under the age of 35) more likely to possess the technical and language skills needed to make use of and contribute to the peer reviewed literature than those over the age of 50. Although younger researchers are more likely to rely on and contribute to the scholarly literature, the common remark is that conducting commissioned research for an industrial patron is more important than conducting basic research with the output being a scholarly publication. The impetus for conducting commissioned research is due to both the paltry financial rewards associated with being a researcher and the demand for research by firms that lack an internal research capacity.

5.2 Librarians:

Librarians at research institutes and universities reported several challenges that hindered their ability to enhance the information search skills of researchers. These challenges include the deficiencies in the training of librarians, the diminished role the library has within the research institute’s administrative and financial structure, and the fact that researchers are not accustomed to relying on the library as a means of obtaining published research. Librarians at research institutes and universities also reported several challenges in building up the collection of scholarly communication initiatives they make available to researchers. With researchers unaware of what the library offers, librarians often are provided with little guidance of what scholarly communication needs are being unmet. Even when librarians are aware of what researchers want, there is often a lack of funding with budget allocations often designated for specific purposes and staffing considered a higher priority than collection building. Moreover, librarians are often faced with inadequate funding for the development of internal technology such as catalogs and websites. Librarians have advocated for the need for additional training and funding and universities have responded because of the threat of losing government accreditation. This accreditation requires certain spending levels, a minimum size in terms of square footage, a document outlining the library’s collection philosophy and management structure, and embrace electronic scholarly communication initiatives. This accreditation also
requires that librarians possess a certain level of training. To deal with inadequate levels of funding for collection building and an accreditation process that requires the embrace of electronic scholarly communication initiatives, librarians have also been encouraged to participate in consortia so as to share resources and have embraced open access initiatives to expand what is available to researchers at minimal expense.

5.3 Research Administrators:

At government agencies like the Mongolian Academy of Sciences and the Mongolian Foundation for Science and Technology there is concern, as is often typical at government research funding agencies worldwide, that there is not enough funding to finance all the research that needs to be done. Internally within these organizations, as is also typical at government research agencies worldwide, there is not enough staffing available to administer the research process. There is concern though that the government as the financier of research applies a cost-benefit analysis too frequently to decisions made and consequently places too little emphasis on basic research and too much emphasis on applied research and innovation. Although the administrators and researchers are frustrated with the lack of funding and priority placed on research that has some market application, there is also frustration expressed that research conducted isn’t sufficiently informing government decision-making. While research administrators recognize that applied research is important, the focus that has always been placed on basic research has meant that publications are still an important output from the research process. Since 1996 this has meant field-specific journals that are peer reviewed. With that said, the largely domestic scholarly communication process has been a difficult tradition to break among researchers. Although the younger generation of researchers may be more willing to publish their scholarship in peer reviewed published, the Mongolian Academy of Sciences and the Mongolian Foundation for Science and Technology have made movement towards establishing a repository of Mongolian research. This repository would ensure that the investment made in research would generate higher returns than if the research had not been seen by others. The challenge is that despite the government’s significant investment in basic research and the emphasis placed on this basic research being converted into peer review publications, there is very little investment in the scholarly communication process. Thus, while
the administrators of research funding view scholarly communication objects as critical inputs and outputs to the research process, the government as the financier of research do not see it the same way and invest very little in making journal articles and books available to researchers.

5.4 Conclusions from the Assessment by Interview:

The interviews with researchers, librarians, and research administrators is instructive in that it reveals among researchers a research culture that has been slow to develop, among librarians a frustrating lack of financial resources and skilled professionals, and among the research administrators a lack of financial commitment by the government. From this it would seem that the type of scholarly communication needed in Mongolia that simultaneously meets the needs of researchers, librarians, and research administrators and promotes the establishment of a knowledge-based economy by balancing the publication of peer reviewed research with the need for marketable research is open access initiatives. These are initiatives that are affordable, scalable to the type and levels of intellectual contributions made by researchers, and given the lack of financial commitment required, can accommodate the low skill level of researchers and librarians by being familiar over a long time horizon. As certain open access scholarly communication initiatives achieve greater popularity and usage, mergers can be pursued of similar journal titles and spinoffs of journals promoted as research specializations emerge. An entrepreneurial researcher, librarian, or government official can start an open access initiative that meets their needs. Alternatively, an existing open access initiative can accommodate a perceived need within a developing country so long as individuals are willing to provide the needed labor and minimal technology resources.

Under donated-access scholarly communication initiatives, the looming threat is that what was once donated will have to be paid for and the lack of funding and the anemic research culture will translate into lost access and a research environment that worsens. The publishers providing donated access, whether they are for profit or not for profit, cannot be expected to provide resources free of charge in perpetuity. What publishers provide with donated access are resources developed for major research universities in the developed world. Although these same resources are useful to researchers in developing countries, the specific research needs of these scholars are not likely to be addressed.
6. Alleviating the Natural Resource Curse in Mongolia through Open Access Scholarly Communication Initiatives:

From assessment via criteria and interviews it is apparent that open access scholarly communication initiatives best serve the needs of researchers, librarians, and research patrons. That a scholarly communication initiative serves the needs of these parties is undoubtedly important. However what is also important is the ability of a scholarly communication initiative to enhance economic growth and encourage a transition away from resource extraction and towards the application of skills and knowledge. Donated access and open access scholarly communication initiatives do not equally contribute to economic growth with open access initiatives holding out the greatest potential for creating sustainable economic growth over the long run.

The challenges in Mongolia are that there is a lack of funding for scholarly communication, low information searching skills, and a lack of commitment to basic research by both the research or the patron to research. While both donated and open access scholarly communication initiatives meet the limited budget available for scholarship and, with experience and training, meet the low skill level of researchers, only open access scholarly communication initiatives can foster the development of a research culture. This research culture is essential to building a knowledge-based economy because only when knowledge is seen as a tool that is incorporated into the production of goods and delivery of services and is widely available can sustainable growth be achieved. Open access scholarly communication initiatives are available to all and can be customized to the research priorities of researchers and those who finance their activities.

With donated access, research is only available to researchers who have the appropriate affiliation. With donated access, researchers and their patrons in developing countries have access to a resource that wasn’t developed with them in mind. With donated access, the protection of intellectual property is a priority. Consequently, researchers and their patrons that turn to the scholarly literature through donated access are likely to be frustrated. Their frustration translates into a research culture that continues to flounder.

With open access scholarly communication initiatives, researchers across the country can
seek out the knowledge that they need to conduct the applied research that their patrons demand. The lack of restrictions on accessing and contributing to open access scholarly communication outlets encourage the publication of research after market applications have been extracted from it. Open access scholarly communication objects play an important role in the development of a country’s national innovation system. A national innovation system, defined as a system that organizes and coordinates the flow of information and knowledge among researchers, their patrons, research institutes, and industry, is essential to building a knowledge-based economy. Open access journals and databases will collect and organize the substantial research currently being conducted within the country that currently has little exposure domestically and abroad. The heightened exposure of research leads to researchers publishing more and others relying more on Mongolian research as its reputation increases.

7. Concluding Remarks:

The Internet in its early years was touted for its ability to spur economic development in developing countries. In the case of Mongolia, the rise of the Internet coincided with the country’s transition to a market-based economy. And thus at the beginning of the new millennium there existed an electronic information network that could bring researchers in the landlocked and largely isolated country closer to the global conversation in their discipline. The goal in the early 2000s was to bring the Internet to the desktop of most every researcher and increase awareness of what was available. At the same time as open access scholarly communication initiatives were made available to any researcher with an Internet connection, publishers began to donate their scholarly communication products to researchers in the developing country.

And it is here where the debate now stands. In a rapidly developing country that is growing courtesy of natural resource extraction, there is a desire to avoid the natural resource curse by setting up the conditions for a knowledge-based economy. This knowledge-based economy requires a scholarly communication system that encourages the two-way exchange of

33 In the science and technology master plan of Mongolia the development of a national innovation system is identified as a priority in strengthening the research system and economy. Ministry of Education, Culture, and Science (2007), p. 32 and 60.
34 Freeman (1995) represents the seminal piece on the economic benefits to having national innovation systems.
information. Currently the scholarly communication system in Mongolia consists of an uncoordinated combination of open and donated access scholarly communication initiatives. With open and donated access scholarly communication initiatives not being perfect substitutes, the question is which type of initiative best meets the needs of researchers and their patrons and furthers the goal of creating a knowledge-based economy.

Using two methods of assessment, one based on the criteria of relevance, access and ease of use, affordability, usage, and capacity building and permanence and a second based on interviews with researchers, librarians, and government administrators, it becomes apparent that open access scholarly communication initiatives best met the needs of researchers and their patrons and strengthens economic growth. Open access scholarly communication initiatives have the advantage of not only meeting the resource constrains in the country but also can be reconfigured to nurture an emerging research culture in the country, simultaneously encourage both fundamental and applied research, and co-exist with a national innovation system that organizes and coordinates information flowing from multiple channels. While donated access to scholarly communication is appreciated and useful over the short run and has the side-benefit of encouraging libraries in the country to cooperate and form consortia, it also requires technological skills that few librarians or researchers possess, will eventually require subscription fees that most are unwilling to pay, and may prove to be of little use in a country where the research culture is still in its infancy stage. It is with open access scholarly communication initiatives that Mongolian researchers can utilize existing knowledge and information and transform it into the products and services that will fuel economic growth and smooth the transition from an economy with resource extraction as its centerpiece to one that is knowledge-based.

Bibliography:


