Open Access Publishing: the emerging opportunity for wider dissemination of scholarly output

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ABSTRACT

The purpose of this paper is to create awareness on the part of researchers and the scholarly community at large regarding the new publishing opportunity for dissemination of their research findings. It highlight on limitations of the current business model of scholarly publishing in dissemination of scientific information as the main cause for the emergence of open access. The paper introduces open access: a means of free availability of scholarly content on the Internet, permitting any user to read, download, copy, distribute, print or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself. Open access journals and self-arching as the two main approaches of open access publishing are highlighted. Compares adoption of open access between developed and developing countries. The paper further presents preliminary findings on the awareness, usage as well as researchers' general perspectives about open access scholarly communication in Tanzanian public universities. The overall results of the study indicate that many researchers use open access to access scholarly content and generally support the new mode of scholarly communication.

1. Introduction

Scholarly communication is a broader term reflecting various processes through which scholars exchange information with each other in the course of knowledge creation. Thorin (2003) identifies three main distinct aspects in scholarly communication:

- the process of conducting research, developing ideas, and communicating informally with other scholars and scientists;
- the process of preparing, shaping, and communicating to a group of colleagues what will become formal research results and;
- the ultimate formal product that is distributed to libraries and others in print or electronically.

The system of scholarly communication has evolved over time since it came into existence. The current system of scholarly communication is said to have originated as an exchange of letters and lectures among scattered peers until in 1665 when the first print journal known as Philosophical Transactions was launched by the Royal Society of London (Thorin, 2003; Swan, 2007). Economic and technological changes are cited as the major reasons contributing to the notable evolution of the scholarly communication system we are witnessing today (Thorin, 2003; Moller, 2006; Swan, 2007). From the onset of the first journal, scholarly publishing was dominated by scholarly societies until after the World War II when commercial publishers joined the industry as a result of scholarly societies' failure to cope with the rapid increase of research output emanating from universities (Yiotis, 2005). Unlike the scholarly societies which had no much interest in making profits through journal sales, the commercial publishers utilised their control of the scholarly publishing industry to raise the journal prices until they were beyond the ability of the libraries and other institutions serving the scholarly community (Thorin, 2003; Yiotis, 2005; Moller, 2006). Due to the rapid increase of scholarly output and the inflated journal prices, it is becoming practically difficult even for libraries in rich countries to subscribe to every journal that is required by their clients.

Information and communication technologies (ICTs) developments have also contributed to the evolution of scholarly communication by affecting the documentation format of scholarly content and its dissemination. ICTs have dramatically changed research practices in terms of scholarly communication by enhancing: communication among scientists; access to information of all kinds; and by provision of a greater variety of publication and dissemination platforms (Moller, 2006). According to Willinsky (2003), 75 percent of journals are currently available online and among them more than 1000 peer-reviewed journals are said to be available in digital format only. Publishers have used such developments to change the accessibility legal framework for electronic journals from copyright law in print format to contract law which further restricts access to literature (ALA, 2003; Swan, 2007). Under the contract law, publishers sign contracts with individual libraries or consortia for accessibility to bundles of journals at an agreed cost usually for several years. In such an arrangement, even those journals that are not needed by a specific research community are paid for. In the real sense this kind of arrangement has not solved the problem of scholarly content availability to the research

community. This is due to the fact that more burden has been added to libraries as a result of the publishers negotiating three or five year deals, tying libraries into long-term commitments in cash" (Swan and Brown, 2004: 5). The other drawback of the traditional scholarly publishing is that a substantial amount of research output [especially grey literature] that do not follow the normal publishing protocols remains invisible to most of the research community. Under these circumstances, libraries from resource poor countries may not be able to enter into those contracts. As a response to the frustrating journal prices and the enabling technologies, the scholarly community is coming up with alternative scholarly publishing systems aiming at wider distribution of scholarly content without price or other copyright restrictions to end users (Bjork, 2004; Yiotis, 2005; Moller, 2006). The emerging scholarly communication model is known as open access as described under the following section.

2. **Open access scholarly communication**

The Berlin Declaration (2003), defines open access (OA) as a new mode of scholarly communication through which the author(s) and right holder(s) of scholarly work grant(s) to all users a free, irrevocable, worldwide right of access to, and a license to copy, use, distribute, transmit, and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship. According to this definition a complete version of the work and all supplemental materials, including a copy of the permission to use should be deposited in at least one online repository using the suitable technical standards to enable open access, unrestricted distribution, and long-term archiving of such works. The new form of scholarly communication is achieved through two main channels: Open Access Journals (OAJ) for electronic refereed journals and Self-archiving (Chan and Costa, 2005: 149; Barley, 2006).

2.1 Open access journals
Open access journals also referred to as "Gold Road" to open access, are peer reviewed journals made available free of charge to the public through the Internet. Unlike the business publishing model, in open access publishing the end user is not charged to access journal articles. Instead, various funding strategies such as direct author fees, institutional membership to sponsor all or part of author fees, funding agency payment of author fees, grants to open access publishers and institutional subsidies are used to cover the costs for publication and distribution of OA content for free access by the end user (Hirwade and Rajyalakshmi, 2006). Some of the open access journal avenues for direct access include: the Directory of Open Access Journals (DOAJ); the directory of Free Full Text; Free Medical Journals Directory; the HighWire Press; and the Open J-Gate. It is also possible to access open access journal articles indirectly by using search engines such Google or Google scholar.

2.2 Self-archiving

Self-archiving also referred to as "Green Road" to open access is making articles freely available in digital form on the Internet by authors (Budapest Open Access Initiative, 2002). There are three most common ways of self-archiving on the Internet: authors' personal websites, disciplinary (research-specific), and institutional repositories of individual universities/institutions (Bjork, 2004, Barley, 2006). The Registry of Open Access Repositories (ROAR) and the Directory of Open Access Repositories (DOAR) provide the list of open access compliant archives from disciplinary and institutional archives worldwide. As the case with open access journals, articles from ROAR or DOAR may be accessed through direct search of respective repositories/directories or indirectly using other search engines.

2.2.1 Authors' personal websites

These are as simple as a few linked web pages with associated e-print files in HTML, PDF, Word or other formats. According to Barley (2006), such websites are often indexed in major search engines such that a searcher with specific information about the desired e-print can get the information required. However, the stability of e-prints from personal websites is variable and permanence is not assured.

2.2.2 Disciplinary repositories

These include e-prints from one or multiple scholarly disciplines and are usually hosted at a central server. Some of the existing disciplinary archives are: AXIV - the oldest disciplinary archive which covers physics, mathematics, non-linear- science, computer science and quantitative biology; E-LIS for library and information science disciplines; DLIST for library, information science and technology disciplines; and Repec covering the economics disciplines (Hirwade and Rajyalakshni, 2006). Since disciplinary archives are formally affiliated with institutions or professional organisations, their stability and permanence is more assured than author's personal websites (Barley, 2006).

2.2.3 Institutional repositories

Institutional repositories (IRs) include e-prints or other types of digital works by authors in a single academic department or school or the whole institution. The digital works in institutional archives may comprise of electronic theses and dissertations (ETDs), e-prints, learning objects, presentations and technical reports by authors of respective institutions (Barley, 2006). As for disciplinary archives, the institutional archives stability and permanence is assured due to the fact that they are managed and hosted by respective institutions.

3. Problem statement

Through open access, the visibility and accessibility to research output from both developing and developed countries is made easy and without restrictions. This is contrary to the business mode of scholarly publishing that increases the information access gap between the rich and poor countries. Despite the promising potential of open access to improve scholarly communication in developing countries, the new mode of publishing is not yet wide spread in such countries when compared to developed countries (Moller, 2006; Papin-Ramchan and Dawe, 2006). According to the Directory of Open Access Repositories (DOAR), for example, more than half of the registered open access repositories by end of September 2008 were from developed countries while developing countries in totality had few repositories than individual countries like the USA, Germany and UK (DOAR, 2008). A similar trend is observed from data obtained in the Directory of Open Access Journals (DOAJ), indicating that during same period, among 3663 journals in DOAJ only 19 journals were identified as being published or hosted in Africa (DOAJ, 2008). Such observations raised the interest of the author of this paper in finding out the extent of open access adoption by researchers in Tanzanian public universities. Results reported in this paper are part of the ongoing investigation titled "An analysis of open access scholarly communication in Tanzanian public universities". This paper reports the awareness and usage of open access as well as researchers' perspectives about the new mode of scholarly communication in Tanzanian public universities.

4. Research methodology

Researchers from the rank of Assistant lecturer to Professor were drawn from the Institute of Housing and Human Settlement (Ardhi University); Institute of Traditional Medicine and the University library (Muhimbili University of Health and Allied Sciences); the Institute of Development Studies and the Department of Quantitative Methods (Mzumbe University; Institute of Continuing Education and Directorate of Information Technology (Open university of Tanzania); Faculty of Science (Sokoine University of Agriculture); and the Institute of Resource Assessment (University of Dar es salaam). In situations where the selected units had less than 15 respondents, the researcher chose an additional unit in order to select reasonable number of respondents. The questionnaire was distributed to all researchers who were on station during the survey period. The total number of the expected respondents was 110 but during the survey period the respondents who were available on station were 95. Among the distributed copies of the questionnaire, 57 (60%) were returned duly completed. Data analysis was done using SPSS version 12.0.

5. Results and discussion

This section presents and discusses the findings of the study. The study findings are presented basing on the three key investigated aspects: awareness and usage of open access as well as researchers' perspectives about the new mode of scholarly communication.

5.1 Background of the respondents

A total of 57 respondents were involved in the pilot survey, 38 being males (66.7%) and 19 females (33.3%). The highest proportion (43.9%) respondents were aged between 31-40 years, followed by those aged between 41-50 years (24.6%). The 20-30 (12.3%) and the 51-60 (14%) age cohorts had a somewhat similar number of respondents. Only a few respondents (5.3%) were above 60 years of age. Distribution of the respondents by rank and institution is summarized in table 1. Overall, lower ranks were predominant in comparison to higher ranks. This is due to the fact that the study was conducted during long vacation when most researchers were either on leave or out of station for other duties such as consultancy.

5.2 Open access awareness

Awareness is a pre-requisite to subsequent usage of open access unless an individual uses it unknowingly. This aspect was investigated by requesting the respondents to indicate whether they had heard about open access before participating in this survey. It was established that majority of researchers (63.2% of 57 respondents) had heard about open access before participating to this survey. The most common known terms or initiatives by researchers were open access journals (known by 59.6% respondents) and open access repositories (known by 22.8% respondents). Very few respondents knew about specific open access initiatives such as Budapest open access initiative (none), Open access movement, (8.6%) and the OAIster.org (2.9%) respectively. With regard to how they got open access awareness, majority of researchers (47.1%) of 34 who responded to this question) claimed to have heard from their colleagues, 26.5% by following Internet debate while minority were informed through publishers' promotion (8.8%) and workshops (7%) respectively. Other studies done elsewhere in developing countries had also reported similar findings regarding open access awareness (De Beer, 2005; Moller, 2006; Ouya, 2006). These results suggest the need for more awareness creation on the part of researchers so that they benefit from opportunities availed by open access for access and dissemination of scholarly content.

Table 1: Distribution of respondents by rank

Rank	Institution						Total (%)
	ARU	MUHAS	MU	OUT	SUA	UDSM	
Assistant lecturer	8	1	9	9	6	5	38 **(66.7)**
Lecturer	2	2	3	1	1	-	9 **(15.8)**
Senior lecturer	1	-	3	-	1	2	7 **(12.3)**
Professor	-	1	1	-	-	1	3 **(5.3)**
Total	11	4	16	10	8	8	57 **(100)**

Key: ARU- Ardhi University; MUHAS – Muhimbili University of Health and Allied Sciences; MU – Mzumbe University; OUT – Open University of Tanzania; SUA – Sokoine University of Agriculture; UDSM – University of Dar es salaam

5.3 Open access usage

Open access usage was investigated to find the extent to which researchers accessed and disseminated scholarly content through that mode of scholarly communication. It was observed that while majority of the respondents (71.7% of 53 researchers) claimed to access scholarly content through open access means, just a small proportion (21.2% of 52 respondents who replied to this question) disseminated their research findings through open access. While both female and male respondents claimed to have used open access to access scholarly content, no female respondent published research output by using the dissemination outlet in question. A further analysis revealed that those who published in open access avenues, 7 published in open access journals and eight in open access repositories. None of the respondents reported to have published using personal websites. Low usage of open access outlets by researchers to dissemination their research findings than accessing other scholars' works have also been reported in several studies (Gadd et al, 2003; Pelizzari, 2003; Schroter and Tite, 2006). These findings are probably attributed by the fact that open access publishing is still new to many researchers and that some of them access open access materials without the prior knowledge of open access itself.

The author was also interested in determining possible factors affecting usage of open access by respondents. Factors that hinder researchers' use of open access content were determined by looking at problems that the respondents claimed to face while using the Internet as well as their ratings on the availability of facilitating conditions for their open access usage. Slow Internet connectivity and inadequate Internet search skills were reported to affect usage of the Internet by most respondents. It is beyond reasonable doubt that most of the problems faced by researchers while using the

Internet also apply to them in accessing open access content as the later depend on Internet. Close to half of the respondents disagreed or strongly disagreed of having the necessary resources adequately [such as Internet access] to use open access content. It should be noted however that overall, as noted above, many researchers accessed open access content than they published in open access outlets implying that they probably faced few constraints as far as accessing open access scholarly content is concerned.

Table 2: Open access usage by respondents

Open access usage	Gender		Total (%)
1.Literature access	Male	Female	
a. **Yes**	22	16	38 **(71.7)**
b. **No**	13	2	15 **(34)**
2.Publishing			
a. **Yes**	11	0	11 **(21.2)**
b. **No**	24	18	**41 (78.8)**

To determine factors that hinder researchers in disseminating their research output through open access avenues, the respondents were requested to indicate reasons for not publishing in such outlets. They were provided with a list of pre-conceived reasons so that they indicate the extent of their agreement or disagreement with such reasons. Results from this investigation revealed that close to three quarter of respondents (44 researchers) strongly agreed or agreed with the reason that they were not familiar with open access publishing as the major cause for not publishing in such outlets. The other reason which was highly scored is the researchers' worry on long-term availability of open access publications. Majority of the pre-conceived reasons were lowly ranked by many researchers. It should be noted however that long-term availability of electronic publications is a challenge even in the traditional mode of publishing [business model]. Other factors that were cited to affect researchers to publish online which are equally likely to affect those wishing to publish in open access avenues include: lack of skills to publish online; slow internet connectivity; publication charges by some publishers; and lack of appropriate sites to publish. It should also be noted that author charges is practiced by some open access publishers for their publications to be accessed freely by users. Most of the reported constraints affecting researchers in accessing or disseminating research content using open access avenues are common in other developing countries (Hirwade and Rajyalakshimi, 2005; Muthan, 2006). Some of these constraints are likely to ease as researchers get used to the new mode of scholarly communication and as the ICT infrastructure improves in respective countries.

5.4 Researchers' general perspectives about open access

Continued usage of open access outlets dependent on among other aspects how the new model of scholarly communication is perceived by its potential users. The researcher was further interested on the respondents' general perspectives about open access. This aspect was assessed by determining how they perceived open access publications they accessed as well as their attitudes towards open access concept in general. With respect to how the respondents valued open access publications they accessed, among 36 respondents, the majority rated such publications as original and presented high quality research (69.4%); and that publications represented adequate standards of high quality research (80.6%). On the negative side very few respondents claimed that open access publications were mediocre with little scientific merit (5.6% of 36 respondents). The other minority (14.3% of 35 respondents) pointed out that some open access publications were of high quality while others had low quality with little scientific merit. In general therefore open access publications were positively perceived.

 As far as researchers' attitudes towards open access is concerned, many respondents either strongly agreed or agreed with all positive statements about open access [publishing in open access is a good idea; accessing and use of open access materials is a good idea; and open access content is beneficial to the scholarly community] by scoring more than 90% except the statement on "publishing in open access outlets would make my work more interesting" that was scored by 67.2% of 55 respondents who strongly agreed or agreed with that statement. On the other hand, similar negative statements scored high on the disagreement side implying a net positive attitude regarding open access publishing by majority of the researchers. The positive attitude about open access by researchers was also noted from individuals who provided general comments about open access. Statements such as : OA is very new to most academicians though it seems to be very good as far as accessibility to information is concerned; OA is something new and interesting, it should be promoted; developing countries should accelerate the pace of establishing OA publishing in order to make their publications openly accessible; Open access is a good initiative but non-peer reviewed publications should be taken with caution; Open access publications increase the visibility and impact of scientific findings from researchers to a wide audience especially in developing countries; African university fund should be established to support OA publishing; and scholars in developing countries should be encouraged to publish in open access so that their findings reach more people. These results suggest the general acceptance of open access principle: removal of barriers to dissemination of scholarly content by the respondents. There were no statements that were totally against open access from open ended questions implying further acceptance of open access scholarly communication.

6. Conclusion

The current business model of scholarly communication has been noted to restrict dissemination of scholarly content such that it is increasingly becoming difficult for researchers from developing countries to access scholarly content of their choice. As a result of the escalating scholarly content subscription costs and the enabling information and communication technologies, the new model of scholarly communication known as open access is emerging. It is believed that open access is liberating the scholarly communication process from the current crisis of restricted dissemination of scholarly content. The overall results of the preliminary study on analysis of open access scholarly communication in Tanzanian public universities indicate that many researchers use open access and generally support the new mode of scholarly communication. However, the fact that the study involved minority of researchers in few research disciplines selected using non probability sampling, such results may not be generalised for the whole population of Tanzanian public universities' researchers. More insights regarding the awareness and open access adoption in Tanzanian public universities will be revealed after the main study that will also employ inferential statistics to determine important factors for open access adoption enhancement in the country.

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Recommended Open Access Sites

➢ **Directory of Open Access Journals [http://www.doaj.org]**

  ✓ Offers free access to full text, quality controlled scientific and scholarly journals.

  ✓ Authors may also identify appropriate journals to publish their articles.

➢ **Directory of Open Access repositories [http://www.opendoar.org] and Registry of Open Access Repositories [http://roar.eprints.org]**

  ✓ Lists open access repositories worldwide and users may search articles across repositories from a single search interface without visiting individual repositories separately.

➢ **OAIster [http://www.oaister.org]**

  ✓ OAIster is a union catalogue of digital resources. By end of September 2008 it provided access to 17,945,811 records from 1018 contributors.

➢ **SHERPA/RoMEO Service [http://www.sherpa.ac.uk/romeo]**

  ✓ Details the rights given to authors [as they relate to archiving their works online] by major publishers of peer-reviewed academic journals.

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