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Value creation in scholarly community: The role of open access publications

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Abstract

Open Access (OA) is an innovative form of scholarly communication in the digital environment. But the process of creating values for author and readers through OA is vague. The study demonstrates OA values among the scholarly community. The finding is based on primary data collected from 214 academic authors for determining perceptions of OA among authors. Besides, secondary data from journal articles, project proposals, research reports, and conference proceedings were reviewed for analyzing OA impact among readers. Results show that OA provide value for authors through improved visibility and citation; while improved access, linking global experts and advancing knowledge for readers.

Keywords:

Value Proposition, Value creation, Open Access, Open Access Publication, Scholarly Communication.

1 INTRODUCTION

Selecting a publication channel is an important factor for maximizing the effect of research output. In principle, there are options for publishing research results in printed journals with no online access, printed journals with online access, subscription-based journals and free or open access journals with free access opportunity. Access to printed journals needs much cost because information seekers or their institutions must purchase a printed copy of the desired journal. Besides, due to different circumstances and financial constraints, many potential users cannot access such printed research results. Some printed journals also provide online access to users who purchase the printed version of the journal. Although this type of online journal provides easier access than only the printed version of the journal, users must still subscribe for access and use. Open access (OA) journals do not charge readers for accessing and using scholarly contents. Hence, OA provides greater access and visibility of research output.

Many research funders nowadays motivating their fund recipient to publish their research finding in open access domain for greater public interests. Directorate-General for Research & Innovation of European Commission mandates its research grant beneficiaries to ensure open access to all peer-reviewed scientific publications either publishing in OA journals or depositing the publications in repositories [1]. Libraries and academic advisory body of many universities encourage their author for publishing research content in OA platform [2]. Besides, nowadays circulating research finding free of charge for knowledge improvement and innovation has become one of the core principles of many countries. Accordingly, though many authors are heading to publish their research article in OA publication, a lot of potential authors still publish their scholarly content with paid publishers. For improving scholarly communication authors of paid publishers needs to reconsider- a) how to earn greater public impact on research finding, b) why open access publications are getting popularity among authors, academia and users, and c) how to add more values with the research finding. To address these issues, this research discusses on value creation process in scholarly content among authors and readers. In addition, the research also highlighted different issues related to value optimization among different entities of scholarly communications. including authors' motivation towards publishing OA journals.

2 STATEMENT OF PROBLEMS

Publishing scholarly content is a must for academics as well as scientists. Through traditional publishing policy authors usually assign the copyright ownership to the concerned publisher. The publisher publishes articles and provides access through charging the subscription money either for printed copy or online access or both. In general universities, large institutions and companies or personal strata subscribe scholarly journal or its web-based access for its patrons. But a lot of journal increase their subscription fees on regular interval. In a survey, the Association of Research Libraries identified that the journal subscription prices moved faster than inflation during 1986 to 2015[3]. For example, EBSCO estimated 25% per-journal subscription price hike during 2013-2017[4]. As a result, many libraries have to cut off their subscription list to adjust the journal subscription budget [5]. The subscription practice limits the access opportunity to those who pay the required money. But, a lot of other interested users cannot access and use such scholarly contribution. On the contrary, academic institutions provide financial supports from public fund for conducting research. But if the library of such institution does not subscribe the journal, students and users of the institution cannot access and use those research result. Besides, public institutions provide research finance from public tax. But, a large number of general readers/users cannot access research output and unable to gain benefit from the tax payer funded investment. Accordingly, those research cannot contribute the development activities towards the society as required. Figure 1 illustrates the traditional research cycle and the value of money invested for research.

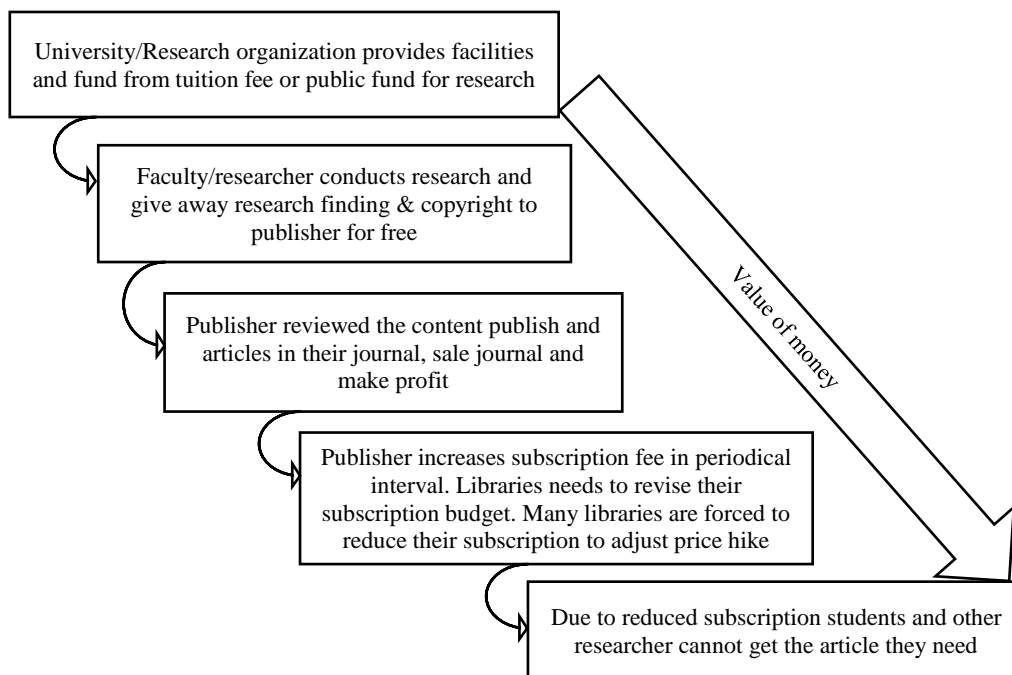


Figure 1: Value proposition in research fund

Considering the issues, research output need to ensure open access for ensuring value of money for both institution and users. Open access has become a common tool for information seekers and information providers. Through OA anyone can read, download, copy, distribute, print, and search the full texts of articles, browse them for indexing, or use them for any other lawful purpose without financial, legal, or technical barriers [6]. OA also enables to share research output, academic results and information disseminated to the academic community for better usability and visibility [7]. But for enhancing better informed scholarly community both authors and readers can play a vital role for promoting OA.

Considering the above issues, this research aims to develop a value proposition framework in scholarly communication. The sub-specific objectives are follows to-

- i. explore authors perception towards open access;
- ii. demonstrate open access impact in scholarly communication; and
- iii. develop a value proposition framework in scholarly communication.

3 METHODOLOGY

The study is based on review of literature, computation of primary data and consultation of relevant databases. Firstly, the study reviewed different literature including journal articles, project proposals, research reports, and different repository websites and databases for analyzing the trends and impact of OA. Secondly, for understanding authors' motivation of scholarly publishing and perception towards OA, primary data were collected from 214 academia of five universities in Bangladesh through a structured close-ended questionnaire. The collected data were analysed using Statistical Package for Social Sciences (SPSS) version 17.0 for Windows. The authors' perception towards OA were measured through five-point Likert Type scale ranging 1-strongly agree to 5-strongly disagree and presented in bar-charts. Authors' motivation towards scholarly communication were also measured through five-point Likert type scale and presented in mean and standard deviation in SPSS table. The value creation model was illustrated in figure.

4 FINDINGS AND DISCUSSION

4.1 Emergence of open access

Open Access emerged as an alternative model of scholarly communication. The journey of OA began since 1991 when arXiv.org launched its operation enabling scientists archiving their pre-published content to online repository platform [8]. Later on some notable declaration and mandate triggered the growth and development of OA. Important declaration includes Open Archives Initiative, 1999 [9]; Creative Commons, 2000 [10]; the Budapest Open Access Initiative, 2002 [11]; the Berlin Declaration on Open access, 2003 [12]; the Bethesda Statement on Open Access Publishing, 2003 [13] are very remarkable. In addition, the open access mandate adopted by authors' institution and funder accelerated the proliferation of the OA movement throughout the world. Under the OA mandate faculty or research staff including research grant recipients must publish their research result in either open access journal or deposit the post-published content in institutional repository [14–16]. Many countries also encourage OA for better informed scholarly community. In response to the growing demand to make research free and available to anyone, OA can accelerate open research in advancing the output of research related to the sciences, technology and medicine. The open access literature is available in open access journals, institutional repositories, subject repositories, digital archives, and so on. To increase visibility and promoting accessibility to scientific research output, two online platforms originated, namely Directory of

Open Access Journals (DOAJ) and Registry of Open Access Repositories (ROAR). DOAJ indexes and provides access to high quality, open access, peer-reviewed journals. As of April 2018, DOAJ content includes 3,078,343 articles from 11,509 journals of 136 countries [17]. Conversely, ROAR aims to promote the development of open access by providing access facilities to institution-based repositories. Approximately 3,521 registered organizations throughout the world are providing access to their repositories through this directory [18]. It is observed that both the journals and number of articles are growing steadily in both DOAJ and ROAR.

4.2 Open access and scholarly publishing

Open access is a state of publication which is freely available online to all at no cost and with limited restriction with regards to reuse [19]. OA refers to works that are created with no expectation of direct monetary return and made available at no cost to the reader on the public Internet for purpose of education and research [20]. Suber defined OA as digital, online, free of charge and free of most copyright and license restrictions [6]. Budapest declaration defines open access as state of literature which is freely available on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, 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 [11]. However, open access publication pattern has different features depending on the nature of publication policy. Green route to OA is a model of scholarly publishing whereby researchers and academics can self-archive the pre-print or post-print copies of their research work or publications to open access repositories. Green OA is very similar to self-archiving. Self-archiving is a practice of placing a version of an author's manuscript into a repository, making it freely accessible for everyone. However, the version that can be deposited into a repository is dependent on the funder or publisher [19]. Under Green OA, copyright policy is reserved with publisher. On the other hand, Gold route to OA is a model of scholarly publication where author or author's institution pay a fee to the publisher during publication time. As a result, the publisher makes the material available free for publicly use. Gold OA makes the final version of an article freely and permanently accessible for everyone, immediately after publication. Copyright for the article is retained by the authors and most of the permission barriers are removed. Gold OA articles can be published either in fully OA journals (where all the content is published OA) or hybrid journals [19]. Besides, there are also another type of OA 'Hybrid OA'. Hybrid OA is a subscription-based journal that allows author to pay a fee for making a permanent OA of their article. But Platinum OA or non-fee OA does not require any fee from authors.

4.3 Value creation in scholarly communication

Value creation is generally described in business and economic discipline to demonstrate usability of products and services. Value can be determined with the joint effort of users and producers' point of view. Value creation is a state of action aiming for enhancing performance for meeting customer satisfaction as well as increasing market share and profit for producers. Value creation may be applicable both for extending performance for products and services. In S-D Logic, value creation usually means co-creating values with the joint effort of service provider and customer [21]. However, Gronroos and Vornia defined value creation as the notion that all actors, customers, and firms alike co-create values, without any distinctions between the service provider's and customer's roles and actions in that process [22]. Value has two main aspects: perceived use value and exchange value. Use value is a state of products or services that meet the need of consumer. Perceived use value is subjective in nature which is determined by customers, based on their perceptions and the usefulness of the product. On the other hand, exchange value indicates the state where consumers willing to pay for using the products and service. Exchange value is realized when the product is sold. It is the amount paid by the buyer to the producer for the perceived use value [23]. In the resource-based theory of firm (RBT) value creation or value capture are considered as main source of competitive advantages [24]. Provider considers value creation as a means of capturing more customer with their production by adding new feature relating to customer need. A resource has also been defined as valuable if it either enables customer needs to be better satisfied [25].

Scholarly communication is the process of creation, dissemination, evaluation, sharing and getting feedback of any scholarly activities for enhancing research and scholarship. As intellectual community shares their ideas and views by documenting their research result, the content itself here consider as product. The value of scholarly content depends on the usages and demand of the content. Value creation in scholarly communication means to increase usability of scholarly content both for authors' and users' community. How effectively the scholarly content can be utilized is the main concern of value creation in scholarly community. Measuring values of scholarly content is a difficult task. However, authors' value is the recognition of his intellectual contribution. While users' value is the accessibility and usability of such content for developing their own research and competency.

4.3.1 OA Values for Authors

Scientific authors devoted their time and effort for creating and justifying their professional knowledge. Though professional recognition and social responsibility motivate scientists to create new knowledge, scientist seek recognition for their work. Recognition can be measured through wide public engagement, visibility and usability of scientific result. Visibility is a state in which users can easily find any document without any trouble. Visibility relates to the dissemination, availability, and accessibility of any intellectual output. Rich visibility can ensure maximum use and frequent citation by other scholars. OA publications provides free access to all. As a result, OA ensures increased visibility and the usage of its content. Besides, having easy and free access OA provides a greater engagement of users who do not have institutional subscription of paid journals. Making wider collaboration is also an important issue for authors. OA provides greater public engagement and collaboration. Greater engagement also ultimately reflects the usability of scholarly content of authors.

Citation is also an important value measurement tool of scholarly content. Citation is the recognition of using someone's thoughts or ideas in framing and validating one's own writing. A citation is generally embedded in the body of an intellectual work and denotes an entry in the bibliographic references section of the work. Citation generally used for acknowledging the relevance of the works of others to the topic of discussion at the spot where the citation appears. Open access increases the citation and research impact. This study examined previous research findings on citation and visibility impact of OA. Focuses were given to different disciplines-based journal, for instance, health and medicine, mathematics, economics, biology, physics, chemistry and other social science disciplines. It is found that with the increased access

and visibility, the citation increased 26% in health and medicine discipline 45,716 PubMed open access journal [26], 55% more citation than toll access for health and medicine journals [27]; in chemistry 24% citation increased in low impact factor journal [28]; citation increased for 12,345 of among science journal 88% and 52%-82% for physical and life science journals [29]. Lawrence study reviewed 119,924 conference articles in computer science discipline and identified citation increased from 157% to 284% [30]. Harnad and Brody also identified 250% - 580% citation increased on physics journal article over the examination of 95,012 articles [31]. In 2004, Antelman also examined 2017 mathematics and electrical engineering journals and found the citation increasing from 45% to 91% [32], Besides, Davis observed 2,765 articles on four mathematics journals identified citation increasing around 35% [33] in case of OA. In 2004, McVeigh compared OA and non-OA citation pattern on 239 Web of Science indexed journals and revealed that new articles published in OA journals received higher citation percentage [34]. Other important study on citation impact analysis includes two fold citation increased in Astronomy [35]. Hajjem and Harnad conducted research on 1,307,038 articles on biology, physics, sociology, political science, law, economics and other discipline of Web Of Science database. The research revealed the citation increased ranging from 36% to 172% for the ten years period [36]. Archambault analyzed about one million articles published in different multi-discipline journals which are indexed in Scopus database. Results showed that the citation increased between 26% and 64% among different disciplines [37].

The previous studies suggest that OA add values to scholarly content of scientific scholars and authors by increasing citation, promoting visibility and engaging other scholars and users.

4.3.2 OA Values for Institutions/Publishers

Publishers want to maximize the use and subscription of their published content. For this, publisher always try to distribute their content for wider audience globally. But, the subscription-based journals' audience confined to the subscriber only. In case of OA, anyone can access the content from anywhere. This wider access opportunity increases publisher image globally. Davis study identified that on comparison to subscription based journals full text download were increased 89%, PDF download increased 42% and visitors increased 23% in case of OA in the first six months after publication [38]. The study concluded that OA publishing reach more readers than subscription access publishing. The increased visit and download from users indicate greater value of content, therefore OA brings additional value for institution.

4.3.3 OA values for Readers

Readers wants to access as much content as possible through either subscription or open access. Being subscription issues involved access to paid publisher is difficult for many readers. The users of developing countries as well as patrons of having low library budget for journal subscription suffers lot. But OA can ensure free access to all. Besides, OA enables connecting more people on the same discipline. Hence, OA can ensure value for readers through allowing access to required content including maintaining global network.

4.4 Authors' perception towards OA journals

Open Access journals are largely electronic journals and the contents are openly accessible to the readers free of charge across the Internet. Open Access benefits researchers, institutions, nations and society as a whole by increasing the visibility, usage and impact of research work. This study identified the perception of open access and open access publications among the authors. At first, authors were asked to indicate their level of agreement or disagreement relevant to a pre-defined parameter. Figure 2 illustrates the responses from the scholars.

FIGURE 2: Researchers' view on selected aspects of OA and OA publications

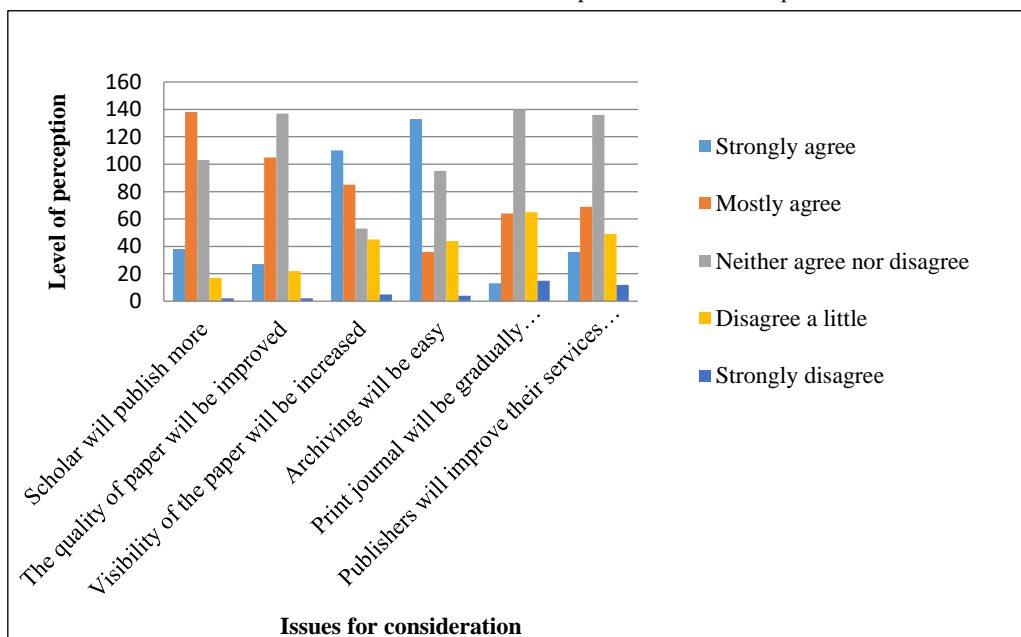


Figure 2 shows that researchers or scholars have mixed attitudes towards OA journals. The analysis of specific questions shows that most of the researchers (138 respondents) mostly agree that with the help of easy access opportunity, an open access platform will assist a researcher

in publishing more, although a good number (103 respondents) neither agree nor disagree with the issue. In terms of quality of publication, i.e., with the help of OA, 'the quality of paper will be increased', the respondents have a reverse opinion, with most of the researchers (137 respondents) neither agreed nor disagreed. However, most of the researchers strongly agree that with the help of OA, the visibility of their published paper will be increased, and archiving will be very easy. At the same time, most of the researchers neither agreed nor disagreed concerning 'print journals will be gradually disappeared' and 'publishers will improve their service quality' in the age of OA.

4.5 Authors motivation towards scholarly communication

Scholarly content reflects the intelligence, professional knowledge and critical-thinking of an author in a specific domain or issues. Authors usually write report to remember, to understand and to gain perspective in his research activities [39]. Scholarly communication helps intellectual community to communicate with peers for creation, dissemination, evaluation, sharing and getting feedback of any scholarly activities for enhancing research and scholarship. O'Connor described authors conduct scholarly communication with writing to protect intellectual property, gaining reputation, achieve high citation etc. [40]. However, authors have the full privilege to publish or distribute their intellectual output to other scholars. But in most of the cases, researchers make any research for public interests or for the benefit of others.

Rowlands reported the views and attitudes of 3,787 senior researchers from 97 countries concerning authors' attitudes towards freeing scholarly content and found generally positive remarks [41]. The Joint Information Systems Committee (JISC) and the Open Society Institute (OSI) surveyed journal authors' perception towards OA. The survey investigated the authors' awareness of new open access possibilities, the ease of identification and submission to open access outlets, the experiences of publishing work in OA, concerns about implications of open access publishing and the reasons why they did or did not chose to publish through an OA outlet [42]. The study reported that almost two-thirds of respondents were familiar with the OA concept. The primary reason for choosing an OA outlet is a belief in the principle of free access to research information. Those authors also perceived OA journals as being faster dissemination option than traditional journals. They believe OA have a larger readership which results in higher numbers of citations of their work. Swan and Brown [43] surveyed 1296 academics worldwide to determine the current situation with respect to authors' self-archiving behaviour. The survey also explored author experiences and opinions on publishing in open access journals. This study attempt to explore authors' motivation towards sharing scholarly content to other scholars. Table 2 illustrates the response from the authors.

Table 2: Purpose of scholarly communication

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Collaboration with global professionals in same discipline	213	1	4	2.26	.833	.695
Professional recognition	213	1	5	2.13	.796	.634
Meeting academic requirement	213	1	4	2.10	.846	.716
Validating knowledge with other professionals	214	1	5	2.05	.827	.683
Idea generation to new research	213	1	5	1.88	.898	.806
Valid N (listwise)	210					

For maximizing research impact, authors share their ideas and research result to other community in different ways and purposes. This study examined authors motivation towards scientific communication through a five-point Likert type scale ranging 1-strongly agree to 5-strongly disagree. Results show that motivation towards scholarly communication includes: idea generation to new research (M=1.88, SD=0.898) and validating knowledge with other professionals (M=2.05, SD=0.827). Other issues include: collaboration with global professionals in same discipline, professional recognition and meeting academic requirement whose mean ranges from 2.05 to 2.26.

5 ACCESS AND DISTRIBUTION OF SCHOLARLY CONTENT

The adaption of digital communication media especially web technologies boosted intellectual community to access and share knowledge efficiently and conveniently. Authors use web technologies to manage and providing access to their intellectual output to global readers. Information seekers also find web technology as a gateway of accessing many unreached contents for boosting their research. Now authors and readers can communicate each other through maintaining self-archives, institutional repository, consortium-based repository, aggregated search platform and other means as well.

5.1 Self Archiving

Self-archiving is an initiative of authors for preserving and providing access to their intellectual output. In some cases, authors institution or authors designated third-party preserve and manage resources on behalf of authors. But in case of journal article authors are not always allowed to archive their content. In this case authors must follow the publisher policy before making self-archive. In this case, the SHERPA/ROMEO database, administer and maintain by University of Nottingham may be a helpful tool for authors. The RoMEO project (Rights METadata for Open archiving) of SHERPA is a web-based service with default copyright and archiving policies of scientific journals and publishers [44]. The service also provides links to publishers' web sites and their copyright guides. SHERPA/RoMEO is a good tool to find out whether any publications are allowed to archive in open access repository or not. Anyone can search Sherpa/RoMEO database with the journal title or its ISSN number.

5.2 Institutional Repository

Institutional Repository (IR) is an online platform for managing intellectual content created by the members of an institution. The content of IR includes journal articles, research data, e-thesis, e-learning objects, teaching materials, or any other scholarly work such as theses and dissertations created by the faculty, research staff, and students of a particular institution. IRs play a fundamental role in centralizing, preserving, and making accessible of institution's intellectual capital. At the same time, IR forms part of a global system of distributed and interoperable repositories that provide the foundation for a new disaggregated model of scholarly publishing[45]. IR provides scholars with a common platform so that everyone in the institution can contribute scholarly material to promote cross-campus interdisciplinary research. IR became very popular among the information seekers, provider and authors as well. As of July 2018, around 3,519 academic and research organizations are managing and providing access to their intellectual content through IR [17].

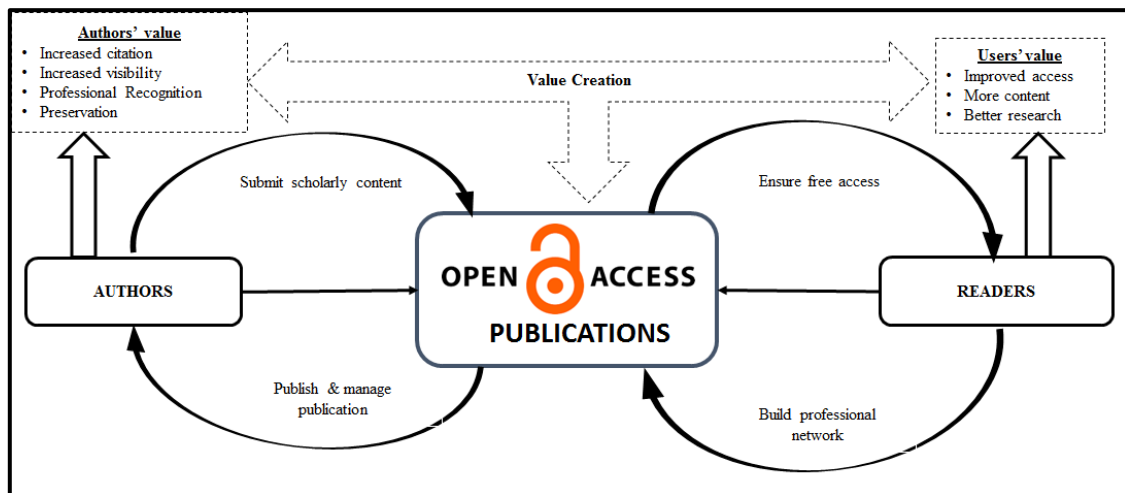
5.3 Consortium Repository

Beside IR, many countries formed consortia-based repository for maximizing the impact of research. SHERPA-LEAP (London Eprints Access Project, a partner in SHERPA) was established in February 2004 as a consortium of seven Higher Education institutions. The aim of the project was to create e-prints repositories, hosted centrally by UCL (University College London), for each of the partner institutions, and to populate those repositories through collaborative advocacy. Norway's repository network NORA (Norwegian Open Research Archives) was consisted only four research universities at the beginning. But now NORA is a platform of 70 Norwegian institutional repositories covers around 200,091 repository contents [46]. In Netherlands, the SURF organisation set up DAREnet3 to link the institutional repositories of all Dutch universities. In Australia, the top research universities having IR are linked to form ARROW (Australian Research Repositories Online to the World). The ARROW Discovery Service, developed and operated by the National Library of Australia, provides the search interface. In India, the Shodhganga@INFLIBNET has the ability to capture, index, store, disseminate and preserve Electronic Theses and Dissertations (ETDs) submitted by the researchers [47]. As of July 2018, Shodhganga included more than 195,241 full text PhD theses from 325 contributing universities. Open Access Repositories in New Zealand (OARINZ) project connected institutional digital research repositories of New Zealand. In Japan, JAIRO (Japanese Institutional Repositories Online) provides free of charge access to academic information (journal articles, theses or dissertations, departmental bulletin papers, research papers, etc.) of cross-sectional Japanese institutional repositories. As of July 2018, JAIRO contains about 2,933,060 contents from 694 organizations to be searched for [48]. There are also such consortium-based repositories in different countries which are serving as a gateway of scholarly content to the scholarly community.

6 VALUE CREATION IN OPEN ACCESS PUBLICATIONS

Value creation in OA is a cyclic and inter-related process among different entities. Primarily OA value creation entities include the authors, publishers and readers. Figure 3 illustrates the relationship between authors and publishers as well as publishers and readers. The figure also explains how authors and readers mutually create value for each other with the help of OA.

FIGURE 3: Value creation model for Open Access Publications



In academic world, authors and researchers conduct research on various topics on different social needs. Besides, many scholars conduct research to meet up their self-interests. For validating the research output, authors usually publish their content to any publisher to be published. In case of open access journal, author submit he content to the OA publisher free of cost. After following necessary procedure, the concerned journal publishes the scholarly content in their respective journal. Preservation and managing access to the research content is also important issues for authors. Concerned publisher not only publish the content but also preserve the content on behalf of author. Dissemination of published content is also another important issues of publishers. At the same time, OA publishers provides access to its published content to its readers. As an anticipated benefit, OA ensures access to all classes of readers. As a result, readers have better access. Readers also have scope to increase their professionals network through accessing other professional's study of interest and content. By this way open access can uplift value to users in terms of improved access, building global collaboration and accessing quality content. On the hand, as OA ensures wider access to authors content, author gets much citation in their work, Besides, visibility, professional recognition and preservation facilities also increased.

7 CONCLUSION

Opening research results may lead to many advancements, including accelerating scientific discovery, stimulating innovation, reducing duplication of effort and enhancing economic growth and job creation. In the eve of accelerating influences of Artificial Intelligence (AI), access to all OA publishing model can be only tool for accessing and diffusing knowledge. Accordingly, open access journals are moving towards the mainstream of academic publishing. Open access publishing can serve as a tool for knowledge creation, sharing, utilization and a means to advance knowledge at the individual, organizational, and national levels.

This model of scholarly communication creates value for authors by increasing the reach to unreached, growing visibility, enlarging citation and building worldwide communities. Students, practitioners, general users and researcher of less developed countries and users of small organization having limited budget finds OA as convenient tool for accessing scholarly publications. By this way both authors and users overcome the access barriers and develop mutual benefits and creates value in their own perspectives. In addition, open access to scientific and technical knowledge can help policy-makers, researchers, and government and non-government organizations to access and use relevant documents to accelerate research and sustainable development. Accordingly, academic libraries, research funders and many non-profit organizations throughout the world are jointly promoting OA for better informed society. Considering the growing brand image of OA, paid publishers should adopt OA and develop their business strategy accordingly.

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