Identifying the role of open access information in attaining the UN SDGs: perspectives from the Asia-Oceania region

Jayshree Mamtora
Office of Library Services, Charles Darwin University, Darwin, Australia.
jayshree.mamtora@cdu.edu.au

Prashant Pandey
Office of Library Services, Charles Darwin University, Darwin, Australia.
prashant.pandey@cdu.edu.au

Abstract:

In 2015, the UN General Assembly adopted a set of 17 Sustainable Development Goals (SDGs) covering social and economic development issues including poverty, climate change, social justice, and education, in all countries throughout the world. The intent at the core of the SDGs is recognised in the formal title "Transforming our World: the 2030 Agenda for Sustainable Development". Libraries and librarians have been a part of the post-2015 UN development agenda from the start, as reflected in the Lyon Declaration on Access to Information and Development released by the International Federation for Library Associations and Institutions (IFLA) in 2014. The Declaration enshrined the idea that 'access to information supports development by empowering people.'

Much earlier, in 2002, the Open Access (OA) movement commenced with the Budapest Open Access Initiative led by a group of international scholars who were keen to allow unrestricted access to journal literature for the public good. This type of access allows the free exchange of knowledge and resources to widen its impact and to encourage creativity. This married the long-standing 'old' tradition – the willingness of researchers to publish their findings, freely and without payment – with the onset of the new online environment. Since then, OA has grown exponentially with the Directory of Open Access Journals (DOAJ) currently lists 3.1 million articles in nearly 12,000 peer-reviewed journals (DOAJ, 2018).

This paper will investigate the impact of OA in the light of the SDGs; that is, the extent to which the objectives of OA dovetail with the contribution by libraries in attaining the SDGs. We will focus on the rise of Open Access in the Asia and Oceania region and will highlight case studies where open access has led to the transformation of communities in different ways. Finally, the paper will make

some recommendations for libraries in the region towards championing OA initiatives, as a step towards attaining the SDGs.

Introduction

This paper will present the first part of a study to provide an evidence-based approach to establishing the link between the availability of open access information and the successful attainment of the UN Sustainable Development Goals. The Sustainable Development Goals of the UN2030 Agenda – also known as the Transforming our world: the 2030 Agenda for Sustainable Development – were adopted in September 2015 with a framework of 17 Goals and 169 targets. The intent was for the goals to be as comprehensive as possible to be all-inclusive, and to ensure that no one is left behind. While the UN's earlier initiative, the Millennium Development Goals (MDGs) 2000-2015, was described by the United Nations as being the 'the most successful anti-poverty movement in history" (UN, 2015, p. 3), it applied only to developing countries. The SDGs were introduced to be all-inclusive and embrace both the developing as well as the developed world. This encourages every country the opportunity to target areas for development.

The Role of IFLA

Having access to the right information at the right time and in the most appropriate form will make an enormous difference as to whether a particular goal is successfully realised or not. IFLA was instrumental in advocating for the inclusion of the importance of access to information in the Goals, and the crucial role that libraries can play in achieving them. Through the release of the Lyon Declaration in 2014, IFLA urged the member states of the United Nations to "acknowledge that access to information, and the skills to use it effectively, are required for sustainable development." "Increased access to information and knowledge, underpinned by universal literacy, is an essential pillar of sustainable development. Greater availability of quality information and data and the involvement of communities in its creation will provide a fuller, more transparent allocation of resources" (IFLA, 2014, p. 2). Their premise was that "increasing access to information and knowledge across society, assisted by the availability of information and ICTs supports sustainable development and improves people's lives." The Library's role is highlighted as that of the enabler, the intermediary that can help acquire the information on behalf of an individual, a community or an organisation, that will help make a difference to attaining the goal. It will empower them "to be able to engage and participate in decisions that affect their lives" (Article 19, 2018, p.4).

The Lyon Declaration states that: "Public access to information enables people to make informed decisions that can help improve their lives. Communities that have access to timely and relevant information for all are better positioned to eradicate poverty and inequality, improve agriculture, provide quality education, and support people's health, culture, research and innovation" (IFLA, 2015). Accordingly, libraries worldwide play a key role in ensuring that access to information, and help people acquire the skills to use this information, and are widely available to all sectors of the community, "making them critical institutions for all in the digital age." "Libraries provide ICT infrastructure, help people develop the capacity to use information effectively and preserve information to ensure ongoing access for future

generations. They provide an established, trusted network of local institutions that can reach out effectively to all parts of the population" (IFLA, 2015, p.3).

IFLA highlighted many ways that libraries and access to information can contribute to improved outcomes across the SDGs (IFLA, 2015, p.4):

- Promoting universal literacy, including digital, media and information literacy and skills, with the support of dedicated staff;
- Closing gaps in access to information and helping government, civil society, and business to understand local information needs better;
- Providing a network of delivery sites for government programmes and services;
- Advancing digital inclusion through access to ICT;
- Serving as the heart of the research and academic community; and
- Preserving and providing access to the world's culture and heritage.

Each UN member nation will look to developing its strategies towards achieving the goals, and it follows that libraries in the respective countries will work with stakeholders and play a key role in helping them meet the goals. Special libraries such as health and agricultural libraries can provide access to vital research that will contribute to overall improved health outcomes, or enhanced food security and nutritional well-being. "Libraries are sustainable institutions; they share resources in the community and internationally, and ensure everyone has access to information. All libraries play a significant role in providing access to data, research, and knowledge that supports informed research and public access to information about climate change, and a key role in the preservation of indigenous knowledge – which includes local decision-making about fundamental aspects of life including hunting, fishing, land use, and water management."(IFLA, 2015, p. 15)
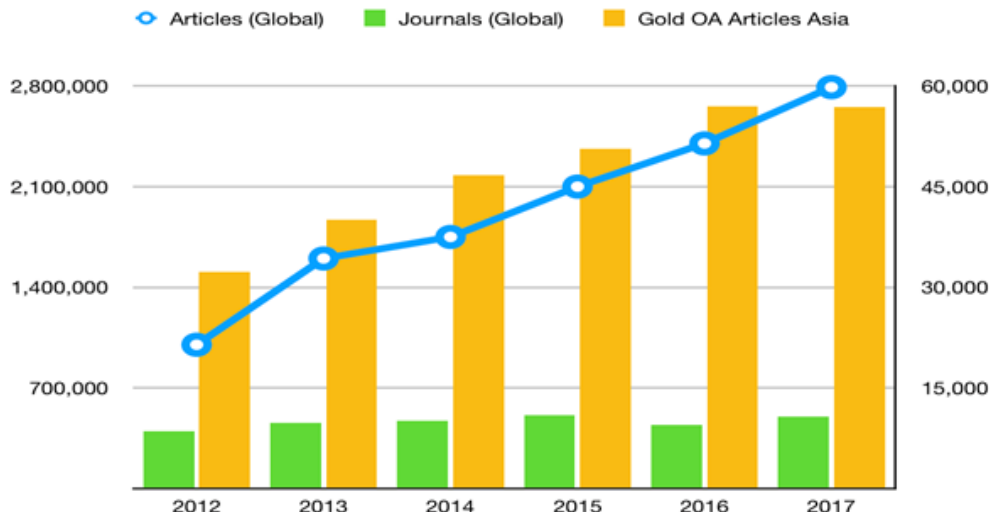
Open Access Information
It is acknowledged that for a goal to be successfully attained, ready access to relevant information has to be paramount. Some information may be readily available. Where the information required is the results of research, it may be locked away in a journal article behind a subscription paywall. To access the content, you would need to pay a fee. Therefore, the more freely accessible the information is, without the worry of having to find the funds to acquire the document, the more the likelihood of it being used to solve a problem, and for it to lead towards the successful attainment of a particular goal. This is known as Open Access. Benefits accrue to all users in all countries, but OA disproportionately but rightfully benefits users in developing countries, with generally more poor or non-existent acquisition budgets.

The Open Access movement began in 2002 with the setting up of the Budapest Open Access Initiative by a group of international scholars who were keen to allow unrestricted access to journal literature for the public good. This type of access allows the free exchange of knowledge and resources to widen its impact and to encourage creativity. Open access publishing models continue to successfully transcend traditional modes of publishing, from one where there is a cost involved in accessing the research, to one that allows freer access. In this way, research is being made accessible to all to read, or to reuse, with libraries once again, playing a leading role in transforming the communities it serves in many different ways. Open Access can play a significant part in the long-term development of communities in any number of ways.

Open Access Models

Green Open Access	Gold Open Access
Deposit or self-archive a version of the article in a repository for use and reuse of information	Pay a fee upfront (Article Processing Charge) for access to published version
Information available online immediately to all	Information available online immediately to all
Easy accessibility and discoverability	Easy accessibility and discoverability
Increases visibility and citation rates	Increases visibility and citation rates
Freely available avoiding paywalls	Freely available avoiding paywalls
Research information as well as research data	Research information as well as research data

The Library will act as a key player, a partner in the process, not only in sourcing the information, but in identifying open access information that is freely and readily available to all wherever possible wherever scientific input is required. A study by Piwowar et al. (2018) found that in 2015, 28 percent of the total scholarly literature was open access and that 45 percent of all research papers were open access. The Directory of Open Access Journals (DOAJ) currently lists 3.1 million articles in nearly 12,000 peer-reviewed journals (DOAJ, 2018). As you can see from the graph below, the growth of gold open access articles in Asia mirrors the growth of open access articles globally.

The graph is based on the data from https://dataverse.scholarsportal.info/dataverse/dgoa.

Unesco and OA

Following the release of the SDGs, the United Nations Educational, Scientific and Cultural Organisation (Unesco) issued a statement declaring the fundamental role open access could play in supporting the SDGs. Unesco's programs are principally designed to contribute to the achievement of the SDGs, and it has "committed to making OA one of the central supporting agendas to achieve the SDGs." "Unesco's OA initiatives are built around the SDGs to recognize the need for ensuring that scientific research addresses the needs of society and responds to current and future sustainability challenges" At least 10 out of the 17 Sustainable

Development Goals (SDGs) comprising the 2030 Agenda for Sustainable Development requires constant scientific input. Given that these goals must be achieved globally, there is an absolute need to remove restrictions to disseminate research outputs to intended stakeholders, irrespective of their geographic location and financial status of those institutions and individuals seeking information (Unesco, 2015).

Unesco and the Confederation of Open Access Repositories (COAR) have since come together and issued a joint statement about open access: "Open access is a global trend, with policies and practices rapidly being adopted around the world. As the world enters a new era of sustainable development, openness and inclusiveness in scientific research will become increasingly critical" (COAR, 2016).

Unesco had already adopted an Open Access Policy (Unesco, 2012) for all its publications with creative commons licenses, intending to reducing the gap between developed and developing countries and making the content freely available to all, free of copyright and other costs. "Building peaceful, democratic and inclusive knowledge societies across the world is at the heart of UNESCO's mandate. Universal access to information is one of the fundamental conditions to achieve global knowledge societies. This condition is not a reality in all regions of the world" (Unesco, 2012) https://en.unesco.org/open-access/.

In addition, it has developed an Open Access Publications portal, which allows the public free access to scientific knowledge in the form of publications. The content spans a variety of development issues and is available in a variety of formats including journals, magazines, videos, and data.

Impact of OA
So, what is the impact of OA, the level of success? Open access has led to a massive increase in publishing, resulting in greater sharing and availability of cutting-edge information. There is greater transparency with funding bodies increasingly mandating that the results of any research that they fund be made freely available online.

On the other hand, access to the internet and the skills to use it are a given. In those instances where the internet and skills are lacking or limited, this, in turn, enhances the rural-urban divide as rural dwellers are less likely to have good internet access, sufficient skills, and money to pay both for Internet access and devices. It also necessarily implies that there is considerable focus on research when the need is also for practical solutions, which are appropriate and implementable.

Over recent years, open access has led to a vast refocusing of services for academic libraries around the world with a significant proportion of research being produced by their academic and research community, which then gets published in scholarly journals. Universities and other academic and research institutions have introduced open access policies to ensure that this research doesn't get locked away behind paywalls and that open access versions of research articles are made available through their repository. Where funding is available, some researchers opt to publish in gold journals, which entails the payment of an article processing charge up front to the publisher, who then makes the results freely available from the journal.

Partnerships: COAR, FAO, and IFLA

Following the release of the SDGs in 2015, an e-forum was organised by the Confederation of Open Access Repositories (COAR), together with IFLA and the Food and Agriculture Organization of the United Nations (FAO) and followed by a series of webinars, to enable conversations on the role that access to information, and the role of open access to scientific information can play in sustainable development. The result was a collection of case studies from different parts of the world that demonstrate the impact open access can have on the sustainable development process (IFLA, 2015).

SDGs and OA

So how can open access initiatives contribute to the SDGs specifically? The following table attempts to match the contribution that open access can make to each of the 17 SDGs.

SDG	OA contribution
SDG 1 End poverty in all its forms everywhere	• Access to research and data • Facilitate learning
SDG2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture	• Access to research and data • Access latest technical information • Facilitate learning
SDG3 Ensure healthy lives and promote well-being for all at all ages	• Access to most recent findings in health and medical journals, both for technical information as well as support in the development of appropriate policies and strategies
SDG4 Ensure inclusive and equitable quality education and promote lifelong opportunities for all	• Access to research and data • Facilitate learning
SDG5 Achieve gender equality and empower all women and girls	• Access to information to broaden and deepen the discussion • Information for policy development of gender-related issues
SDG6 Ensure availability and sustainable management of water and sanitation for all	• Access to research and data for policy development and project formulation
SDG7 Ensure access to affordable, reliable, sustainable and modern energy for all	• Access to research and data for policy development and project formulation
SDG8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	• Access to research and data in support of commercial development • Access to research and data for government policy • Access to information for learning • Access to research and data
SDG9 Build resilient infrastructure, promote sustainable industrialisation and foster innovation	• Access to research and data for policy and strategy development • Access latest technical information
SDG10 reduce inequality within and among countries	• Access to research and data irrespective of geographical location and financial status for equitable access
SDG11 make cities and human settlements inclusive, safe, resilient and sustainable	• Access to research and data for cultural and social awareness

SDG12 ensure sustainable consumption and production patterns	• Access to research and data to enhance awareness of issues and foster discussion • Access to information to inform policymakers • Access to information for project formulation and mitigation strategies
SDG13 take urgent action to combat climate change and its impacts	• As above
SDG14 conserve and sustainably use the oceans, seas and marine resources for sustainable development	• As above
SDG15 protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	• As above
SDG16 promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	• Access to research and data for awareness and discussion for transparent reporting on government-funded projects • Access to research and data for training and skill development
SDG 17 strengthen the means of implementation and revitalise the global partnership for sustainable development	• OA repositories in support of local initiatives • Sharing research and data that reflects collaboration and partnerships for sustainable development, local, national and international

The generic elements that arise as a result of this analysis are that access to research and data is required by:

• Members of the public – for their information, awareness, and understanding; and as a resource for education and lifelong learning
• Governments and policymakers – for effective decision making and policy/strategy development
• Researchers and similar – as a mechanism to share research results; and as a platform that can lead to enhanced collaboration and partnership

The world is getting more and more connected, with developing countries starting to catch up with the rest of the world as far as being connected online is concerned. Where the real issues lie are with accessing the information. Access to information is a critical requirement of policy development; and the more the information is up-to-date, and the more openly accessible (at no cost), the more relevant it is to the discussion, the better, "…the openness of the resource not only ensures wide usage but also stimulates innovation by allowing anyone to develop new value-added services that make use of these resources." As far back as 2008, Cockerill and Knols referred to the example of the Malaria Journal, an open access journal that was launched in the UK in 2002 with 19 articles, and which grew to 170 articles over a period of five years. Along with the growth in a number of articles, the readership increased as well, thus supporting a larger community of practitioners and other interested parties. A better-informed, broader community of people is essential for countries striving to attain their local interpretations of SDGs. Furthermore, the impact factor of the journal of increased to 2.75 in 2006 making it the highest ranked journal in the Tropical Medicine category. This approach of making key research available open access needs to be applied equally to other areas in pursuit of international development. SDG 3 "Ensure Healthy Lives," relies on public

access to health information whether that be among practitioners, policymakers or the general public This example demonstrates how open access research on malaria is contributing to attaining that particular SDG.

Case Studies in Asia and Oceania: Impact of open access research
Open access journals have levelled the playing field. Furthermore, the evidence suggests that libraries are better advised to focus on paying for gold open access then spending money on subscription journals. The availability of open access journals can be a catalyst for countries as they develop their national strategies to redress the SDGs.

Pakistan
Provision of open access awareness materials about urbanisation, water, and sanitation, waste management, etc. (SDG9) by the Urban Unit Learning Resource Centre in Lahore set new goals for sustainable development and played a role for active participation of institutions, government bodies, and citizens.

Indonesia
Public libraries offered micro-entrepreneurship training to more than 84,000 women and youth over the past six years (SDG8). Training participants have researched a variety of ideas for small or household-based businesses, including starting or expanding initiatives related to food processing, growing markets for traditional fabric crafts, and improving methods for crop and livestock production (Global Libraries Program [Bill & Melinda Gates Foundation], personal communication, 22 March 2017).

Thailand
With climate change leading to less predictable weather patterns, the gains in resilience and productivity that come from improved access to information is essential for ending hunger (SDG2). Access to Information doesn't need to be high-tech, the Hia Chai Rice Seed Centre in Thailand uses information wheels made of cardboard to create information about when to sow and harvest accessible. The project has led to yield increases of 10%. (IFLA and TASCHA 2017).

Pacific Islands
PAIS (Pacific Agricultural Information System), is an online and offline digital repository to share documents and information about activities (projects, etc.) with a focus on agriculture in the Pacific Islands, is directly contributing towards SDG2 along with supporting SDG8, SDG13, and SDG15. Among the prospective contributors targeted to date, there is interest in using the platform to increase communication and sharing of information. (Peter Walton, personal communication, 22 June 2018).

Open access data
Along with access to research, the other essential element is open access to data. The availability of open data is vital, especially if we are to meet the SDG targets. Many SDG challenges, such as ending malnutrition, tackling climate change, preventing epidemics and stopping illicit financial flows, demand multi-dimensional solutions, which require sharing and analysing data from many different sources. The Open Data Barometer 3rd edition Global Report gives two specific examples of how open data could help to tackle the challenges highlighted by the SDGs: Stopping Child Malnutrition, and Reducing Illicit Financial Flows.

Case studies in Asia and Oceania: Impact of Open Access Data

India
Excel Geomatics is a private consultancy firm that leverages open data to provide geospatial insights to private and public-sector clients. The c ward maps of more than 700 towns and cities and satellite image-enabled population distribution maps, would not have been possible without access to data from the Indian census, as well as publicly accessible village and district boundary maps.

Indonesia
Kawal Pemilu ("guard the election," in Indonesian) was launched after the 2014 presidential elections, as parties accused each other of vote rigging. Its overall impact was to enable citizens to participate in monitoring the election results, increase public trust in official tallies, and ease a democratic transition.

Indonesia
To monitor deforestation in Indonesia, Global Forest Watch consolidates satellite imagery datasets to monitor global deforestation in real time. Monitoring on this scale has produced several noticeable positive effects. For instance, data from the project has been used in legal proceedings related to illegal logging. Although causation cannot be proved directly, deforestation has declined in both countries, deforestation in Indonesia is at its lowest levels in a decade and has declined by 18 percent. The Indonesian government also uses GFW to monitor forest and peat fires and target response. This project is a forceful demonstration that intelligent use of open data can be used for successful advocacy and sustainable outcomes.

Nepal
After two severe earthquakes in 2015, Nepal had to make a tremendous recovery effort. Nepali open data activists sought ways to crowdsource and deploy open data to identify the most urgent needs of citizens, target relief efforts most effectively, and ensure aid money reached those in need. Many initiatives created post-quake maps that were used by relief agencies, alerted rescuers to Nepalis in need of urgent assistance, provided opportunities for citizens to share feedback on the recovery with the government, and ensured fiscal accountability for aid money through transparency portals. Data-driven disaster preparedness efforts and the use of local knowledge, expertise and connections significantly enhanced the success of the post-quake open data projects. Natural disasters are human and economic calamities, creating a significant drain on the resources of countries and the international community. The initiatives discussed in this case study showed the potential for open data to inform crowdsourced data collection efforts, helping to save lives and make relief efforts more effective.

Japan
After the 2011 earthquake and tsunami off the Pacific coast of Tōhoku in Japan, electricity supply, and demand data were released as open data through a joint effort of the Ministry of Economy, Trade, and Industry (METI) and Electric Power Companies. These open data led to various application developments on electricity demand and supply, raising citizen awareness of their electricity consumption and allowing them to help the government avoid power failures during periods when demand went up and minimised environmental impact.

(Verhulst and Young 2017).

Recommendations

As a result of the data gathered for this paper, we would like to make some recommendations for libraries and other institutions in the Asia and Oceania region to adopt an open access initiative with the long-term aim of contributing to the UN 2030 Agenda.

•   Set up digital repositories for archiving of open research and data
•   Build new infrastructure and make available ICTs to publish online
•   Create open access policies to mandate the availability of the results of research and enforce OA compliance.
•   Encourage creative commons licenses for publications
•   Convince management about the need, value, and benefits of OA to get their support.
•   Employ staff equipped with the required expertise and skills to work with the institutional repository
•   Make your institutional repository easy for staff to deposit publications
•   Work with other regional, national or international institutions, libraries, research funders, and publishers to develop OA initiatives, policies, and practice guidelines.

Conclusion

In this paper, we have attempted to provide some evidence for the critical role that open access information and data can play, and is playing, in the sustainable development process. IFLA has been instrumental in bringing information to the UN table and highlighting the vital role that information can play towards attaining the SDGs; while Unesco has sown the seeds for making that all-important link between OA and sustainable development. It now remains for libraries to take on the not insignificant role of moving this forward and making crucial information quickly and accessible available to all – governments, policymakers and the broader public towards a better future.

In the second part of our study, we aim to obtain supplementary data, by carrying out a survey of key institutions in the region and identifying success stories on how libraries are making available open access information to critical stakeholders. The emerging results will document further in-country experiences intending to systematically collect new and emerging case studies to demonstrate the apparent link between open access initiatives and transforming the UN agenda.

References

Article 19 2017. Open development: access to information and the Sustainable Development Goals, July 2017: Report.
https://www.article19.org/data/files/medialibrary/38832/Open-Development--Access-to-Information-and-the-SDGs-2017.pdf

Beyond Open Access: Five prerequisites for a sustainable knowledge commons
https://www.coar-repositories.org/news-media/beyond-open-access-five-prerequisites-for-a-sustainable-knowledge-commons/

Björk B 2017. Growth of hybrid open access, 2009–2016. PeerJ 5:e3878.
https://doi.org/10.7717/peerj.3878

COAR, IFLA and FAO 2015. E-Forum "Sustainable Development Goals: the impact of access to information on our societies"
http://s3-eu-west-1.amazonaws.com/assets.aims.fao.org/public/posts/attachments/Use_Cases_e-forum2015.pdf

Cockerill, M, & Knols, 2008. Open access to research for the developing world.
http://issues.org/24-2/cockerill

COAR 2016. Joint statement about open access by COAR and UNESCO
https://www.coar-repositories.org/news-media/coar-and-unesco-joint-statement-about-open-access/

COAR 2017. Open access and sustainable development.
https://www.coar-repositories.org/activities/advocacy-leadership/open-science-and-sustainable-development/open-access-and-sustainable-development/

Ebikeme, C et al. 2016. Open Data in a big data world: challenges and opportunities for sustainable development.
https://sustainabledevelopment.un.org/content/documents/95519_Ebikeme%20et%20al.__Open%20Data%20in%20a%20Big%20Data%20World__challenges%20and%20opportunities%20for%20sustainable%20development.pdf

Graft, A, Verhulst, S and Young, A 2014. Indonesia's Kawal Pemilu—Elections: free fair and open data: the Governance Lab.
http://odimpact.org/case-indonesias-kawal-pemilu.html

The Guardian 2012. The inexorable rise of open access scientific publishing.
https://www.theguardian.com/science/occams-corner/2012/oct/22/inexorable-rise-open-access-scientific-publishing

Hommel, M 2010. 10 years of Malaria Journal: how did open access change publication patterns?
https://malariajournal.biomedcentral.com/articles/10.1186/1475-2875-9-284

IFLA 2014. Lyon Declaration on Access to Information and Development.
https://www.lyondeclaration.org/content/pages/lyon-declaration.pdf

IFLA 2015. Access and opportunity for all: how libraries contribute to the United Nations 2030 Agenda.
https://www.ifla.org/files/assets/hq/topics/libraries-development/documents/access-and-opportunity-for-all.pdf

IFLA 2015. Sustainable Development Goals: The Impact of access to information on our societies e-forum – 7-18 September 2015.
https://www.ifla.org/node/9705

IFLA and TASCHA 2017. Development and access to information 2017.
https://da2i.ifla.org/sites/da2i.ifla.org/files/uploads/docs/da2i-2017-chapter3.pdf

Mamtora, Yang and Singh 2015. Open access repositories in the Asia-Oceania region: experiences and guidelines from three academic institutions.
http://espace.cdu.edu.au/view/cdu:45182

Piwowar et al 2018. The state of OA: a large-scale analysis of the prevalence and impact of open access articles.
https://www.thescientist.com/?articles.view/articleNo/50027/title/Open-Access-On-the-Rise--Study/)

Unesco 2012. Policy guidelines for the development and promotion of open access.
http://unesdoc.unesco.org/images/0021/002158/215863e.pdf

Unesco 2015. Unesco moving forward the 2030 Agenda for Sustainable Development.
http://unesdoc.unesco.org/images/0024/002477/247785e.pdf

Unesco 2015. Unesco Science Report: towards 2030 – executive summary.
http://unesdoc.unesco.org/images/0023/002354/235407e.pdf

Unesco 2016. Open Access to scientific information.
http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-access-to-scientific-information/

Unesco 2017. International Forum on ICT and Education 2030.
https://en.unesco.org/themes/ict-education/international-forum-2017

United Nations 2015. The Millennium Development Goals Report 2015.
http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf

Verhulst, S and Young, A 2017. Open data in developing economies: toward building an evidence base on what works and how.
http://www.africanminds.co.za/wp-content/uploads/2017/10/AM-OD-in-Developing-Economies-COMPLETE-R-WEB-10Nov2017.pdf

World Wide Web Foundation 2016. Open Data Barometer: ODB global report
https://opendatabarometer.org/doc/3rdEdition/ODB-3rdEdition-GlobalReport.pdf