Proceedings of the 9th ProLISSA Conference

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Edited by

Mpho Ngoepe and Madeleine Fombad

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EDITORIAL

These conference proceedings are the work of scholars contributing to the 9th biennial Progress in Library and Information Science in Southern Africa **(**ProLISSA) conference on 'libraries and archives for development in the digital age' hosted by the University of South Africa on 15-17 March 2017. Topics covered in these proceedings include the following: virtual libraries, user and information behaviour, authenticity of digital records, digital divide, knowledge production and library and information science (LIS) education. ProLISSA conferences are intended as a biennial event to showcase South African and African research in the broad field of LIS. The first eight conferences took place in 2000, 2002, 2004, 2006, 2009, 2011, 2013 and 2015. All eight conferences were very successful, and were attended by a number of academics and information professionals from across South Africa, the Southern Africa Development Community countries and further afield. Conference papers that were presented prior to 2011 can be found on the DISSAnet website at http://www.dissanet.com and papers from PROLISSA 2011 are published in *Mousaion* 29 (2) 2011 which is an accredited journal in Information Science.

The conference chair is Prof Mpho Ngoepe and the associate chair was Prof Madelein Fombad both from the University of South Africa. These conference proceedings explore the opportunities and challenges encountered in the practice of contemporary libraries, archives and records management in the digital age. It cannot be overemphasized that the traditional traits and practices of libraries, archives and records management keep changing given the increased use of Information and Communication Technologies (ICTs) in the different information management value chains in different contextual setups. Increasingly we expect information to meet our needs through technological interventions or interactions. Indeed, recent technological developments have accentuated contemporary conceptions of the Library and Information field as an intersection of information, technology, people and society. Contributions for these proceedings addresses libraries, archives and records management issues in the digital era from countries such as South Africa, Botswana, Nigeria, Uganda, Swaziland and Zimbabwe.

Mpho Ngoepe & Madelein Fombad

CONFERENCE COMMITTEE

The conference committee consisted of Mpho Ngoepe, Marcia Nkwe, Salmon Makhubela, Madelein Fombad, Madely Du Preez, Samuel Mojapelo, Sphamandla Ncube, Innocentia Khosa, Nozuko Langa, Bosire Onyancha, Nthabisenng Ncala, Zakithi Nhlapa, Karin McGuirk, Cyprian Ugwu and Jonas Ezema.

COMBATING THE DIGITAL DIVIDE THROUGH SUSTAINABLE DEVELOPMENT GOALS: IMPERATIVES FOR AFRICA'S KNOWLEDGE GROWTH

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Abstract

This chapter analyses the digital divide phenomena as they concern knowledge growth in Africa, with reference to the application of sustainable development goals (SDGs) as panacea. Since the world is moving toward globalisation of its socio-economic, political and educational activities, information and communication technologies (ICTs) are regarded as enablers and a driving force as ICTs are the nervous system of the contemporary society, transmitting and distributing sensory and control information and interconnecting a myriad of interdependent units and systems. Digital technologies have dramatically expanded the information base, lowered information costs, and created information goods. This has facilitated searching, matching, and sharing of information and contributed to greater organisation and collaboration among economic agents – influencing how firms operate, people seek opportunities, and citizens interact with their governments. The study found that after the Millennium Development Goals (MDGs), respective National Plans and other strategies under the New Partnership for African Development (NEPAD), the digital divide is still taking its tolls on African countries. This aggravates the knowledge divide in the continent, owing to its failure to ameliorate the broader socio-economic inequalities, resulting in abject poverty, endemic diseases, incessant war and conflicts, paucity of skilled manpower and infrastructural deficit. The chapter

concludes that Africa has the potentials to turn around the present situation if the basic socio-economic challenges are surmounted, using the opportunities offered by the United Nations Sustainable Development Goals.

Keywords: Digital Divide, Sustainable Development Goals, ICT, Knowledge Growth, Africa.

1. Introduction

Africa is the most beautiful and the ugliest continent in the world. It is almost the most endowed continent in terms of human and material resources, as it is believed to hold 90% of the world's cobalt, 90% of its platinum, 50% of its gold, 98% of its chromium, 70% of its tantalite, 64% of its manganese and one-third of its uranium. Africa possesses significant potential for a demographic dividend, as the second-largest and second-most-populous continent (it accounts for about 15% of the world's human population) in the world, after Asia. Despite these abundant resources, Africa remains the world's poorest and most underdeveloped continent, characterised by corrupt governments, human rights violation, failed central planning, high levels of illiteracy, poor infrastructure, and frequent tribal and military conflicts that lead to the large proportion of the world's 65 million refugees. Africa has the lowest average levels of human development compared to other regions of the world; 36 African countries (out of 44 countries worldwide) are classified in the low development group (UNDP 2016:21).

Africans and African governments have taken the region for granted and have not invested adequately in preserving, conserving, protecting and managing the resources of the region; hence, the continent has suffered great losses, resulting in abject poverty, endemic diseases, incessant war and conflicts, paucity of skilled manpower and infrastructural deficit, leading to the continent's digital and knowledge divides. What would have been the impetus for economic take-off has been squandered unnecessarily, resulting in economic, social and political malaise of the countries of Africa.

Africa has achieved impressive economic growth over the past 15 years, as the average growth of real gross domestic product (GDP) more than doubled from just above 2% during the 1980s and 1990s to above 5% between 2001 and 2014. In the past two years, growth has been more

moderate with Africa's economies affected by headwinds from the global economy; the average growth of African economies weakened slightly in 2015 to 3.6% (down from 3.7% in 2014), about one percentage point lower than expected in 2015 (AEO 2016:24). In this regard, progress in Africa has been hampered by inequality between countries, within countries, and between women and men. It is held back by lack of opportunities for the youth, weak structural transformation, especially in sectors dominated by the marginalised groups (including agriculture and informal sectors), and weak investments in gender equality and women empowerment programmes beyond the political sphere. Human progress for rapidly expanding and increasingly mobile population remains a considerable challenge as encapsulated in the United Nations Agenda 2030 and the African Union Agenda 2063.

To address Africa's myriad of problems and institute technology-driven development, the *2030 Agenda for Sustainable Development* recognises that 'The spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies'. Today many people no longer *go* online, they are always online. Internet access in many parts of the (mostly developed) world is fast, ubiquitous and mobile. Internet users read, shop, acquire degrees, bank and date online, thanks to a growing number of websites, services and applications owing to the massive infrastructural development. In the same vein, the 2016 World Development Report on Digital Dividends, the World Bank (2016:55) noted that:

> the effect of technology on global productivity, expansion of opportunity for the poor and the middle class, and the spread of accountable governance has so far been less than expected,' and that, to date, 'the better educated, well connected, and more capable have received most of the benefits.

It emphasised the need for policy-makers to focus on analogue complements to digital development, a favourable business climate, strong human capital, and good governance. The digital divide refers to 'situations in which there is a marked gap in access to or use of ICT devices' (Campbell 2001:75). There are anecdotal evidences however, that access to ICTs can make a difference to people who have been deprived of it (Goldstein & O'Connor 2000; Chiung 2003). Furthermore, there is clear evidence that such a divide exists between and within countries (Campbell 2001; UNDP 2001). Kim and Kim (2001) proposed one of the most

elaborate and complex conceptualisations along this line of thinking. According to this conceptualisation, the digital divide should be seen as a multi-dimensional (media accessibility, information mobilisation and information consciousness) and multi-staged (opportunity divide, utilisation divide, reception divide) disparity; as such, it goes beyond the "digital" sphere to encompass many of the "non-digital" elements that help to delineate people's positions in the increasingly digitalised information world.

As part of the conceptualisation process of the digital divide, there have been attempts to categorise the digital divide phenomena. Norris (2001) defines three categories of digital divide: the first is called global digital divide, referring to ICT disparities between countries/continents; the second is called social divide, referring to the gap in access to ICT between different sections of a nation society; and the third is called democratic divide, referring to the inequitable exploitation of the virtual space by different political groups. While most related studies deal with the first and second categories of digital divide, a small but significant number of studies (Colby 2001; McPherson 2000; Norris 2001) are concerned substantially with the third category.

ICT represents an important structural part of modern society; therefore, countries strive for constant progress in ICT and why it draws significant attention. The digital divide is not only linked to internet access, but also to usage and how it can stimulate the sustainable development of nation-states, since ICT has accelerated the growth of the global economy and improved the quality life of the world's inhabitants. ICT has brought new ways of creating livelihoods for people: the diffusion of ICT has made it possible to reduce poverty; created opportunities that eventually reduced the "distance" between countries in many other ways.

In countries registering higher levels of ICT adoption, the digitalisation pattern is explained by the Digital Opportunity Index (DOI), GDP, service sector, education and governmental effectiveness. In contrast, in developing countries, population age and urban population are positively associated with the ICT adoption, while internet costs impact negatively.

There are those who do not see access to and use of ICTs as a luxury, but instead see them as determinants of the sustainable development of individuals, communities and nations; hence, a necessity (McNamara 2000). ICTs are viewed as crucial in the development agenda because they

can be used in public administration, business, education, health, and environment, among others (WSIS 2003).

The most optimistic among people see ICTs as providing developing countries with an opportunity to 'leapfrog' stages of development and be on par with the level of development in the West (Nulens 2000). This is evident in a recent study that found a relationship between access to mobile phones and economic growth, with its impact being more significant in developing than developed countries (Waverman, Mesch & Foss 2015:77).

2. Digital Divide and Realities on African Countries

Digital technologies – the internet, mobile phones, and all the other tools to collect, store, analyse, and share information digitally – have spread rapidly in many parts of the world. In many instances digital technologies have boosted growth, expanded opportunities and improved service delivery. Yet their aggregate impact has fallen short, especially on Africa's quest for knowledge-based economy. For example, in Africa, the digital divide between countries can be as high as that within countries, and the digital divide across demographic groups remains considerable. Women use or own digital technologies less than men. Gaps are even larger between youth (20%) and those older than 45 years (8%) (World Bank 2016).

The global ICT Development Index shows that the best performing countries are the Korea Republic (first position with IDI value at 8.84% out of 10), Iceland (second with 8.83%) and Denmark (8.74%) in the third position, while the best performing African countries are the two island nations of Mauritius (73rd with IDI value of 5.55%), Seychelles (87th with IDI value of 5.03%) and South Africa in the 88th position in the world, with IDI value of 5.03%. It is devastating that more than 30 African countries in the world ICT Development Index rank as Least Connected Countries (LCCs) and the region includes all ten countries at the bottom of the global rankings; Madagascar (166th), Tanzania (167th), Malawi (168th), Ethiopia (169th), Congo (DRC) (170th), Burundi (171th), South Sudan (172th), Guinea-Bissau (173th), Chad (174th) and Niger (175th) (ITU 2016; UNDP 2016; AEO 2016). These findings illustrate the extent to which Africa lags behind other regions in ICT development, and the importance of addressing the region's ongoing digital divide.

By the end of 2016, 3.9 billion people – 53% of the world's population – was not using the internet: 75% of people in Africa are non-users; 21% of Europeans are offline; 58.1% in Asia; and 58.4% Arabs respectively (ITU 2016). Furthermore, the global internet gender gap grew from 11% in 2013 to 12% in 2016, with the largest gap in Africa (23%), and the smallest in the Americas (2%). In this regard, the fixed-broadband penetration rate remains at about 1% in Africa and other Least Developed Countries (LDCs), while some countries such as Republic of Korea, Denmark and France have a fixed-broadband penetration rates of around 40% and exclusively high-speed connections of above 10 megabyte per second (Mbps), compared to low-income economies (mostly in Africa) with exclusively lower-speed connections of below 2 Mbps, which results in the huge information inequality. For example, there are more contributions to Wikipedia from Hong Kong SAR, than from all of Africa combined, hence, the amount of information published on the web, and its origin, often corresponds to what one sees in the offline world as well. For instance, 85% of the user-generated content indexed by Google comes from the United States, Canada and Europe, similar to the share of global scientific journals originating in these countries. This is what aggravates Africa's knowledge divide.

Internet uptake in LDCs has increased significantly in the past years, driven by strong growth in a few LDCs in Asia, such as Bangladesh, Bhutan, Cambodia and Myanmar, but also in a few LDCs in Africa, such as Ethiopia, Lesotho, Mauritania, Rwanda and Senegal. However, no LDC currently reaches the global average (4.94) of internet penetration. In addition, in several of Africa's most fragile and poorest countries, still only one person in 10 uses the internet. Hence, Africa is the region with the lowest IDI performance, as the continent's average 2016 IDI value was 2.48 points (just over half the global average of 4.94), compared to Europe 7.35, Commonwealth of Independent States (CIS) 5.74, Americas 5.13, Arab State 4.81, Asia and the Pacific 4.58.

Furthermore, by early 2016, total international internet bandwidth had reached 185,000 Gbit/s, up from 30 000 in 2008, in which Africa has the lowest international connectivity of all regions: there is twice as much bandwidth per inhabitant available in Asia and the Pacific, four times as much in the CIS region, eight times as much in the Americas and more than 20 times as much in Europe (ITU 2016). Conversely, in the Central African Republic, one month of internet access costs more than 1.5 times the annual per capita income. Even mobile phones are expensive: the median mobile phone owner in Africa spends over 13% of his/her monthly

income on phone calls and texting. And many poor people lack the basic literacy and numeracy skills needed to use the internet. In Mali and Uganda, for example, about three-quarters of third-grade children cannot read. In Niger, 7 of 10 adults are illiterate (WDR 2016, p. 86). Hence, majority of LCCs are located in Africa owing to the poor ICT infrastructure, illiteracy and poverty.

2.1 Implications for Africa's knowledge growth

- The divide in access to ICT, speed and use of the internet have impact on the types of services and applications the users can access and benefit from
- Africa has only 2% of the world's ranked scientific journals, and 0.3% of the world's scientists
- Low ranking of African universities and scholars
- Non-visibility of researches emanating from most African countries
- Lack of awareness, accessibility and use of researches conducted in other regions of the world by African scholars

2.2 Bridging the divide in Africa: the role of the UN-SDGs

The UN-SDGs aim to do the following:

1. End poverty in all its forms everywhere
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. Ensure healthy lives and promote well-being for all at all ages
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5. Achieve gender equality and empower all women and girls
6. Ensure availability and sustainable management of water and sanitation for all
7. Ensure access to affordable, reliable, sustainable and modern energy for all
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
10. Reduce inequality within and among countries
11. Make cities and human settlements inclusive, safe, resilient and sustainable
12. Ensure sustainable consumption and production patterns

13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17. Strengthen the means of implementation and revitalise the global partnership for sustainable development.

Even though all 17 goals and 169 targets could be relevant in ameliorating the three dimensions of sustainable development (economic, social and environmental) concern the digital divide in Africa, six goals (goals 1, 4, 5, 8, 9, 10) can specifically be operationalised to combat the digital divide phenomena bedevilling the take-off and development of the knowledge-based economy on the continent. The UN General Assembly reaffirmed this commitment in its ten-year review of outcomes of the World Summit on the Information Society (WSIS) in 2015.

Goal 1: End poverty in all its forms everywhere

African countries should strive to eradicate the extreme poverty on the continent, which is currently measured as people living on less than $1.25 a day, through enhancing the right to economic resources as well as access to basic services and new technologies. Data show that there are strong relationships between economic development and ICT development, as the LCCs are also the LDCs.

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

African countries should abrogate all gender-based disparities and discriminations in terms of access to quality education at primary, secondary, technical/vocational and tertiary education to build the capacity of boys and girls to drive the knowledge production and generation activities enabled by the new information and communication technologies. UNESCO's Global Education Monitoring Report 2016 estimates that nearly 61 million children of primary school age and 202 million adolescent of secondary school age did not go to school in 2014,

many of them living in conflict-affected areas of Africa: seven out of 10 rural youth have never attended school; for example, in Uganda, 72% of secondary school-aged children are not in school (UNESCO 2016; UN 2016; World Bank 2016). Data show that in Africa, the large proportion of the offline population are illiterate, hence the need for countries to invest in their education systems and facilitate access to computers on all levels of education to gain the needed skills to bridge the divide currently afflicting the continent.

Goal 5: Achieve gender equality and empower all women and girls

African countries should adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and abrogation of gender-based wage discrimination; enhance the adoption and use of enabling technologies to promote the empowerment of women, to reduce the gender digital divide. Data show that the global internet gender gap grew from 11% in 2013 to 12% in 2016, with the largest gap in Africa 23%, and the smallest in the Americas 2%. Furthermore, the gender gap in mobile phone ownership and use is higher in low-income and LCCs.

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

African countries should develop and operationalise a strategy for youth employment and attainment of economic productivity through economic diversification, technology upgrading, innovation generation and skilled manpower enhancement. This is largely because technical and vocational education and training have not been a top priority for many African countries; for example, in 2012 technical and vocational programmes accounted for only 6% of total secondary enrolment in the region, a slight drop from 7% in 1999. On the average, only 2 to 6% of educational budgets are devoted to technical and vocational skills development on the continent; hence, companies in Africa repeatedly cite insufficiently skilled manpower as a bottleneck to productivity and growth.

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

African countries need to develop quality, reliable, sustainable and resilient ICT infrastructure at the continental, sub-regional and country levels to support economic activities for peace, enhanced human capital

management and sustainable economic growth; stimulate scientific research, upgrade technological capabilities for innovation generation and promulgate friendly policy regimes for investment in technology deployment and technology transfer in the continent; increase in access to ICTs through the provision of affordable access to the internet, and more specifically the broadband (3G and above) service in Africa. Data show that by early 2016, total international internet bandwidth had reached 185,000 Gbit/s, up from 30 000 in 2008, in which Africa has the lowest international connectivity of all regions: there is twice as much bandwidth per inhabitant available in Asia and the Pacific, four times as much in the CIS region, eight times as much in the Americas and more than twenty times as much in Europe.

Goal 10: Reduce inequality within and among countries

African countries can achieve this through improved income growth of the people, which automatically translate to savings that stimulate investment capabilities of citizenry: empower and promote social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion, economic or other status, of the people of Africa. Data show that most African countries are lagging nearly 20 years behind the developed countries in the internet usage, and face other development challenges, such as low incomes and levels of education and other human necessities. In this regard, the African human development index (HDI) and ranking shows that North Africa leads other African sub-region with 0.668%, followed by Southern Africa 0.570%, Central Africa 0.507%, East Africa 0.497% and the least was West Africa with HDI value of 0.461 (UNDP 2016, p. 76).

3. Conclusions and Recommendations

Across the world, significant progress has been made in meeting many development challenges in which hundreds of millions of people have emerged from extreme poverty: access to education has greatly increased for both boys and girls; the spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide, and to develop knowledge societies. It has been argued that while access to ICTs has increased in all parts of the world, the pace of diffusion in the developed countries has occurred at a faster rate than in the developing world, particularly in Africa, thus increasing the divide between them. In addition, the

contribution of new technologies does not necessarily address the divide that exists within societies in Africa, such as the differences in the level of access between men and women, rich and poor, urban and rural areas, and people with different levels of education.

To turn around the digital divide and make ICT a truly enabling tool for development, the African continent must tackle not only the supply-side challenges, including infrastructure deficiencies and high prices, but also the demand-side barriers that exist outside the ICT ecosystem. This means that it is necessary to address broader socio-economic inequalities, since there is strong association between economic development and ICT development. Above all, people need to acquire not only the necessary digital skills, but also analogue skills, such as basic literacy and numeracy, to exploit the potential of the ICT. ICT policies should also be linked to investments in education to develop the necessary human skills and raise levels of education, and thus bring more people online on the continent. In this regard, surmounting the digital divide in Africa can facilitate bridging the knowledge divide through the following:

- Improving the quality of teaching and research in institutions of higher learning through the provision of current books, journals and other information resources.
- Enhancing access to academic resources serving the higher education community in Africa to global information resources.
- Enhancing scholarship, research and lifelong learning through the establishment of permanent access to shared digital archival collection.
- Enhancing the use and usability of globally distributed, networked information resources.

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Role of Institutional Repositories in Bridging the Digital Divide: A Comparative Analysis of Uganda and Swaziland

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Abstract

Institutional repositories (IRs) were established to promote access to research information through various Information and Communication Technology (ICT) platforms. IRs have become an essential infrastructure for intellectual engagement and collaborative research within universities the world over. IRs are consequently embraced by university libraries to bridge the gap in journal subscriptions and enhance access to research information. While ICTs are the foundational and facilitating infrastructure upon which IRs are implemented, such technologies have widened the gap of the digital divide, particularly between those from poor and underdeveloped countries who cannot access/use ICTs and those who have access. IRs are expected to play a crucial role in minimising the gap of the divide through enhancing access to research for university researchers and the surrounding university communities. Like most developing countries, Uganda and Swaziland are lagging far behind in the development and implementation of IRs. These countries share the

common tag of being amongst some of the poorest countries in the world. This chapter utilised the Capability Approach Theory (CAT) to examine the role of IRs in bridging the digital divide within university environments in Uganda and Swaziland. This can be done through the promotion of research, innovation and entrepreneurship through enhancing access to development information for local communities. The issues discussed in this chapter have implications for research, innovation and entrepreneurship, policy enhancement and theory in a context of developing countries.

Keywords: University Libraries, Institutional Repositories, Digital Divide, ICT4D, Development, Swaziland, Uganda.

1. Introduction

One way of achieving the socio-economic and political development in Sub-Saharan Africa is through guaranteeing the 'adequate provision of information and knowledge for development' (Ezema 2011:473). University libraries can actively contribute to the provision of information and knowledge for development by freely disseminating research output through IRs. Disseminating research output through IRs plays a crucial role in bridging the digital divide by enhancing access to information for researchers and community members without any financial or legal barriers. IRs are therefore expected to ensure that issues including income inequality, ignorance and poor user education no longer inhibit access to research and development-related information. This chapter assessed the roles of IRs in Uganda and Swaziland in bridging the digital divide.

Trending discussions by scholars including Adeyemi (1991), Tibenderana (2010) and Ammarukleart (2017) have mainly focused on the management, dissemination, quality and the ease of accessing digital library collections. These studies are highlighting the fact that a number of libraries have adopted technologies such as IRs, a development which has transformed many African libraries into hybrid collections, consisting of both digital and traditional objects (Tibenderana 2010). On the other hand, Coyne (2010:103) asserts that intellectual discussions on the magnitude and sizes of traditional library's collections have significantly declined. Heery and Anderson (2005) describe an IR as an assemblage of digital objects such as; dissertations, book chapters, books, journal articles and any other relevant materials that are freely accessible to the institution's community of users. IRs also allow the archiving of a wide range of

information resources including working papers, videos, original data sets, lecture notes, conference presentations, audio files and pictures (Heery & Anderson 2005). Heery and Powell (2006) further describe IRs as online platforms that manage and disseminate universities' locally produced research output. IRs are indexed by search engines including Google and Google Scholar, which makes it easy for users around the world to access information resources from various platforms.

Ondari-Okemwa (2004) argues that even though a lot of knowledge is created worldwide, without the necessary dissemination infrastructures such as IRs, such knowledge remains inaccessible. Molawa (2009) further posits that only relevant and usable knowledge has positive impacts on people, not one that is kept in reserves or safe sources. The African continent contributes to the world's vast knowledge even though this is minuscule compared to other regions of the world. Chisenga (2006) asserts that most research from the African continent is in the form of grey literature and unpublished reports, which are rarely accepted or published by internationally recognised journals. This is due to various issues including higher journal subscriptions and prejudice against submissions from developing country scientists. Chisenga (2006) further points out that: grey literature from Africa is produced in limited numbers; circulation of such literature is limited even within institutions where it is produced; and that Africa's grey literature is inadequately documented due to the absence of a databases where such literature can be accessed. Even in those fewer instances where the literature exists, patrons often experience some difficulties in accessing the original full-text documents. The capacity of managing human and institutional African literature is therefore still low. This results in the failure to share research findings amongst African research institutions.

Besides poor access to literature generated within African countries, Molawa (2009) asserts that a low percentage of Africans can access developmental information compared to scholars from other continents. This is due to a number of factors including: poverty caused by high illiteracy and unemployment rates; shortage of skills; poor infrastructure; inadequate bandwidth to enable the upgrade of internet connectivity; high costs of technology; and limited or no access to electric power supply. On the same note, Christian (2008) cites factors impeding access to information including inadequate infrastructure, high costs of bandwidth, epileptic electricity supply in academic institutions, and inadequate funding for research. Molawa (2009) suggests the need to address these challenges by exploring all potential solutions. This, according to

Chisenga (2006), is essential because access to appropriate information at the right time is crucial for Africa's development. The availability of global research to African countries can result in the mitigation of the continent's problems including hunger, poverty, diseases, water and air pollution, climate change, environmental degradation, and deforestation. Similarly, the Digital Divide Organization (2006) argues that solving the poor access to information issues is a prerequisite for solving terrorism problems; poverty alleviation; and ensuring a better international trade.

Fourie and Bothma (2006:474) define the digital divide as the gap between those who can effectively patronise ICTs, and those who cannot. The unequal access and use of technology creates a gap between those reaping the fruits of using technology and those who are not. Bossaller and Atiso (2015:27) state that there is still a huge information access gap between first- and third-world countries, which further results in inequalities between nations. Civallero (2008:159) further argues that the digital divide does not suddenly appear, but is raised day by day and step by step by societies through our attitudes and practices. For example, universities' attitudes and practices towards establishing, supporting or not supporting IRs can either hinder or contribute to the bridging of the divide. Jansen and Sellar (2008) assert that there is a demonstrated relationship between geographic location, infrastructure, language and access to information for development. In fact, rural communities with poor infrastructure and low English proficiency levels often find significant barriers in accessing information, even if it is freely available through various avenues, including IRs.

It is globally recognised that ICTs enable and 'hold great power to bridge economic and development divides' (Bossaller & Atiso 2015:27). African countries must therefore embrace ICTs, actively participate in the global knowledge society, and hence bridge the gaps between the haves and have nots (Alemney & Hastings 2006). University libraries, especially public universities, are uniquely positioned to increase access to information since they provide unique services such as internet access to their community of users. Providing internet access to those in need is a significant step towards providing access to information for development (Healy 2008:185). University libraries thus contribute to development through disseminating relevant information on health, nutrition, crop and animal production, sanitation, hygiene, water supply, disaster preparedness, and other important developmental information (Byamugisha 2009). Traditionally, universities have been disseminating

such information through peer-reviewed journals; however, the trend is now shifting to IRs.

2. Aims and Objectives

This chapter aims to assess the roles played by IRs in bridging the digital divide with a special focus on Uganda and Swaziland, where a comparative analysis is done on the extent to which IRs have bridged the digital divide.

The objectives of the chapter are:

1. To provide a platform for an intellectual dialogue on the perspectives of IRs and their potential of impacting development through their research output.
2. To share innovations and best practices on how university libraries are using IRs to bridge the digital divide.
3. To share research information and literature on the impact of IRs in Uganda and Swaziland.

3. Research Methodology

This study was informed by a document review methodology that gave the study a firm foundation to show the value of this research in the 'larger scheme of things' (Babbie 2004:487). The document review focused only on studies related to specific roles played by IRs in bridging the digital divide. All documents shedding light on the phenomenon under investigation were reviewed. These included: 'published and unpublished reports, administrative documents, minutes of meetings, newspapers, diaries, journal articles and books in print and electronic' (Nieuwenhuis 2016:88). The document review gathering technique helped in reconstructing events, critical incidents and their social relationships. This motivated the researchers to come up with strong and appropriate arguments in the light of the phenomenon under investigation. While evaluating and interpreting documents reviewed in the study, the researchers followed the following structured procedure as explained by Macdonald (2012):

(i) The documents were authenticated to establish whether they were factual, consistent with the literary style and general body of knowledge. The documents were further examined to see how

they advance plausible ideas that are derived from reliable sources.

(ii) Thereafter, the credibility of the documents was assessed to ascertain whether they were free from error and distortion. At this stage the researchers thoughtfully considered issues of subjectivity and bias (O'Leary 2010).

(iii) The documents were further tested for their representativeness. The researchers strived to be as exhaustive as possible, searching from several databases, archives and even grey literature collections.

(iv) Establishing meaning was the last stage of document review where researchers sought to understand both the surface message and the deeper interpretation of the content in the documents, as well as the distinct concepts in the documents reviewed (Punch 2012).

4. Theoretical Framework

The role of ICTs in bridging the digital divide is a common discourse among scholars and many believe that such infrastructures are valuable to societies (Zheng & Walsham 2008). The point of contest is that the very ICTs that can bridge the digital divide can at the same time widen it, especially 'if they are not applied ethically' (Johnstone 2007:74). It is based on this premise that this study was underpinned by the capability approach theory, as it challenges mainstream economic theories that focus solely on material inequality while neglecting broader issues such as lack of freedoms, choices and opportunities. Amartya Sen (1980) advanced the capability approach theory and it has been reviewed from time to time (Sen 1999; Sen 1993; Sen 1985; Sen 2000). The capability approach basically stipulates that policies and socio-economic interventions should not only be executed to alleviate poverty, but the implementers should emphasise what people are able to do with them; ascertain whether the interventions are improving the quality of lives of the beneficiaries, and if they are providing more autonomy for people to live the kinds of lives they desire.

Robeyns (2005) posits that this approach is a broad framework assessing social arrangements, and their eventual impacts on society. In this paper, the capability approach highlighted the disparities between the means and ends, where the means comprised the utilisation of the institutional repositories, and the ends, comprised the IRs' role in bridging the digital