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The "first" and "third world" in Africa: knowledge access, challenges and current technological innovations in Africa

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Abstract
This paper focuses on digitization in the African continent. It highlights the fact that some countries in Africa have both the "first" and "third" world characteristics in terms of development and access to information and communication technology (ICT) tools. The study uses South Africa as a case study representing the minority privileged , who are very rich "first world", compared with the majority population living in rural and urban townships that represents the underdeveloped, poor parts of the country, sometimes referred to as the "third world" component of South Africa. The underdeveloped areas, as in other countries on the African continent, face challenges in accessing information technology as a result of poor infrastructure. The South African case study is further complicated by the apparent divide between the nine provinces in terms of accessing ICTs. For example, some of the provinces are more rural than others and this factor has implications in terms of digitization and availability of infrastructure.

Digitization is a process that is currently looked upon by many to bring about maximum access to global knowledge. Most countries are generating knowledge that is traditionally shared and disseminated in the form of books, journals, monographs and many other formats that have been used for preservation, like microfiche. These are stored in physical buildings such as libraries and archives that pride themselves on the management and dissemination of knowledge. With the advent of modern technology, however, digitization transcends the geographical divide and rigidity of a physical building, as presented by a library and archive, by making global knowledge readily and widely available. Digitization also promotes access to knowledge and information in a faster and cheaper way because the production and geographical challenges are limited if the appropriate infrastructure is available. As a result, the Internet has become the primary vehicle in the sharing of knowledge in addition to TV, radio and other ICT tools. Much as digitization is maximizing access to knowledge, it is cutting the "third world", or underdeveloped countries or parts of the African continent, out of the access loop because of poor ICT infrastructure. Thus these underdeveloped areas have limited access to the

Internet and this paper identifies challenges posed by lack of access to global knowledge, reviews existing solutions and suggests proposals in order to maximize access.

Key words
Digitization; digital divide; information and communication technology (ICT); Internet access.

Introduction

The shift to an information society is making it imperative that people should be in a position to access information and knowledge in any format in which it is available. Knowledge has a great impact on the economic and social aspects of societies (Servon and Nelson, 2003). Elsewhere, Ondari-Okemwa (2004) has argued that a lot of knowledge is created all over the world and for any region to access such knowledge there must be favourable conditions and appropriate infrastructure in such a region. It is relevant and usable accessed knowledge that impacts people's lives positively, not the knowledge that is safely kept in the source. Africa as a continent contributes to the world's wealth of information and knowledge, even if its contribution is minuscule in comparison to other regions. For example, part of the indigenous knowledge on Africa is currently being digitized in the extensive project supported by Carnegie Corporation of New York in South Africa. One of the aims of this project is maximizing access and encouraging open access to global knowledge. The challenge of non-accessible global knowledge in Africa is that only a small percentage of people in Africa enjoy access compared with other continents. The minimal ICT and the prevailing digital divide aggravate the disadvantage that Africa has in accessing global knowledge. There is a need to improve the status quo and ensure that all possible solutions are exploited in addressing this challenge facing Africa and therefore the Carnegie project provides us with a case study in trying to addressing such challenges.

Research methodology

An extensive literature review of printed materials (books, journals and reports) has been done. Online databases were used in the desktop research. Statistical analysis from existing reports was done to give a clear picture of Internet access in the world, to show the position of Africa compared to other continents. A further Internet access analysis within Africa has been captured to show the Internet accessibility levels between urban and rural Africa, that the author referred to as "first" and "third" world respectively. The author went even further to consider the case of South Africa in order to show that the digital divide will continue unabated as long as the uneven distribution of resources prevails; there will be an advantaged group and unfortunately a disadvantaged one also. The increasing rate of wireless access in South Africa might have impacted on the statistics captured, but "traditional" Internet access is a more relevant tool among ICTs to access digital knowledge.

Aims and objectives

The main aim of this study is to inform relevant stake holders about the prevailing situation that has a negative impact on Africa for access to global knowledge. This is done in order for:

- **Government** to make informed decisions when addressing areas of development, underdevelopment, access and reinforcement programmes that bridge the digital divide;
- **Policy makers** to have a true reflection of the status quo on challenges of knowledge accessibility in Africa, to develop favourable policies towards bridging the divide and addressing questions on access;
- **Private sector** to have a clear understanding of the need for social responsibility in making ICT accessible to the majority of the people, particularly the poor;
- **Academics** to appreciate the need for developing relevant programmes of raising awareness of the importance of information and knowledge in improving the quality of life, literacy, and skills development;
- **Researchers** to measure the value and impact of the current programmes of various stakeholders in bridging the divide, and recommend the most effective and efficient solutions to various challenges facing the ICT sectors;
- **Librarians and other information professional**s to reinforce alternative methods of access to information and knowledge, to accommodate those who do not have an opportunity to access digitized information, the majority of whom are from poor, underdeveloped areas.

Digitization

Lee (2001) defines digitization as the conversion of analogue media to digital form. The original medium or source material might be printed text or images and could also be audio visual. It is the creation of a still digital facsimile of a source item, such as a rare manuscript, photograph, slide, journal, painting, monograph or exam paper. Smith (1999) argues that digitization often raises expectations of benefits, cost reductions and efficiencies that can be illusory and, if not viewed realistically, has the potential to put at risk the valuable collections and services libraries have provided for decades.

Disadvantages of digitization

- Digital conversion is moving towards replacing microfilming as the preferred medium for preservation. Reformatting could result in irreversible losses of important and irreplaceable information (Smith, 1999).
- Digital information is not eye-legible, but depends on a machine to decode.
- Smith (1999) went further to indicate that it is difficult to ascertain authenticity and integrity if an image, database or text is in digital form. This has serious ethical implications in certain academic disciplines and professional practices.

- Linked to the above point, researchers and academics might also be challenged to verify independently that an image is indeed a true and faithful representation of the original.

Advantages of digitization

The following have been identified as some of the advantages of digitization:

- **Increasing access:** allowing increased access is the main advantage of digitization because it handles the constraints of traditional access that might involve geographic and economic challenges. The digitized images, manuscripts or any other documents are made available "instantly" to a vast number of people across the world.
- **Preservation:** The digitized material will have a long life span for the generations to come, to share knowledge. Frequent handling of the material reduces the lifespan, even if other measures are used to delay the process of materials wearing out. Currently, the web is still the best place to preserve knowledge, provided the technological trends are augmented.
- **Meeting strategic goals** by increasing the profile of a given Research Institution. Most institutions are creating knowledge through research. The knowledge is then processed and disseminated. Research institutes like the Africa Institute of South Africa (AISA) do research on African affairs, covering all topics in contemporary Africa, such as politics, socio-economic and development issues. The research output is published in forms such as journal articles, chapters in books, manuscripts and policy briefs. In digitized form, such outputs will be accessible worldwide. Furthermore, other specialized materials of the research institute, like thematic maps of the countries in the African continent, will be easily accessible so that the institute can share the African knowledge with the world.
- Bits of data in digital form can be easily manipulated and compressed for storage and can fit onto a small space on a computer drive. The analogue voluminous encyclopaedias take up a great deal of shelf and physical space.
- Searching the analogue encyclopaedia in print is limited to alphabetic searching; the same encyclopaedia in digital form provides searches in many more ways than alphabetically (Smith, 1999).

The advantages and disadvantages of the digitization process therefore make it imperative for any organization to do in-depth analysis and evaluation of materials in terms of the critical criteria of cost and benefit before embarking on the process.

Lee (2001) maintains that the digitization project should be weighed on a case-by-case basis, determining whether the process is worth the cost. For strategic benefits, several institutes have started digitizing with the main aim of maximizing access to knowledge and relevant information.

Access challenges in Africa

In the African continent, South Africa is in a better position with resources as compared with other countries. The country is in a better position relative to the following socio-economic challenges:

- poverty due to high levels of unemployment;
- high level of illiteracy and skills shortage;
- low levels of infrastructure: insufficient bandwidth to allow sufficient telephone lines to upgrade the level of Internet connectivity

The "first world" developed countries are far ahead concerning the above-mentioned socio-economic challenges that African continent is currently grappling with. The fast-growing ICTs in the first world are widening the digital divide even wider, but development cannot be stopped. Hence the development of bridging programmes has to be more dynamic if they are to make any difference in narrowing this digital divide. Accessibility to ICT can be easily determined by the available telephone lines, cellphones, Internet and other wireless tools that ensure easy connectivity and easy access to the wealth of digitized global knowledge.

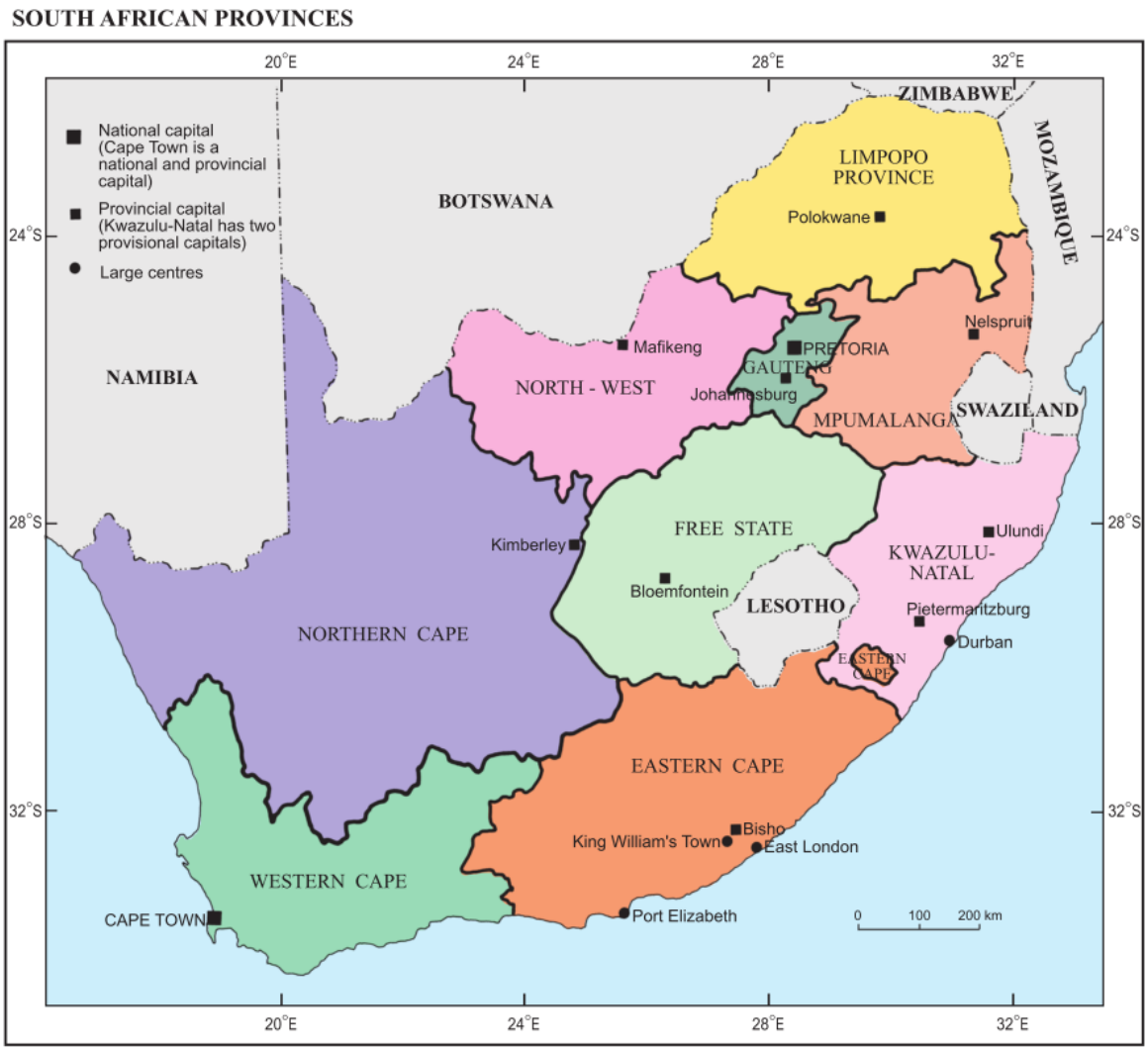
The digital divide

The digital divide refers to the separation of those who have access to digital information and communications technology and those who do not (Dewon and Riggins, 2005). Mossberger et al. (2003) added very important criteria and defined the digital divide as the patterns of unequal access to information technology based on income, race, ethnicity, gender, age and geographical challenges. South Africa, compared with other African countries, often looks better in statistics on knowledge creation and dissemination and even access to global knowledge. When compared with other countries of the world, however, South Africa is not that good, particularly when we consider the digital divide according to race, gender, ethnicity, age and geographical challenges. But no one wants to be left out of the digitization process. It is relatively new, exciting and has raised expectations of many.

The "first" and "third" world in Africa

Mayhew's *Dictionary of Geography* (2004) defines the "first world" as the first areas to industrialize: Western Europe, Japan, Australia, New Zealand and North America. They are known as the developed world, the more economically developed or advanced countries. The "third world" on the other hand is described by *The Concise Oxford Dictionary of Politics* (2004) as those states not part of the first world, principally consisting of the developing world, former colonies of Africa, Asia, and Latin America. We limit our definition to these technical definitions as we are aware of racist and ideological connotations. In short, these are just working definitions and hence Africa is regarded as a developing continent. It is characterised by high levels of illiteracy, poverty and undeveloped ICT. But it also important to take note of the fact that currently, there are areas in Africa that are advanced far enough in various ICT areas and are no longer fit to be classified as "third" world in their advanced

state of economic development. They adequately match or surpass standards set by the developed “first” world.



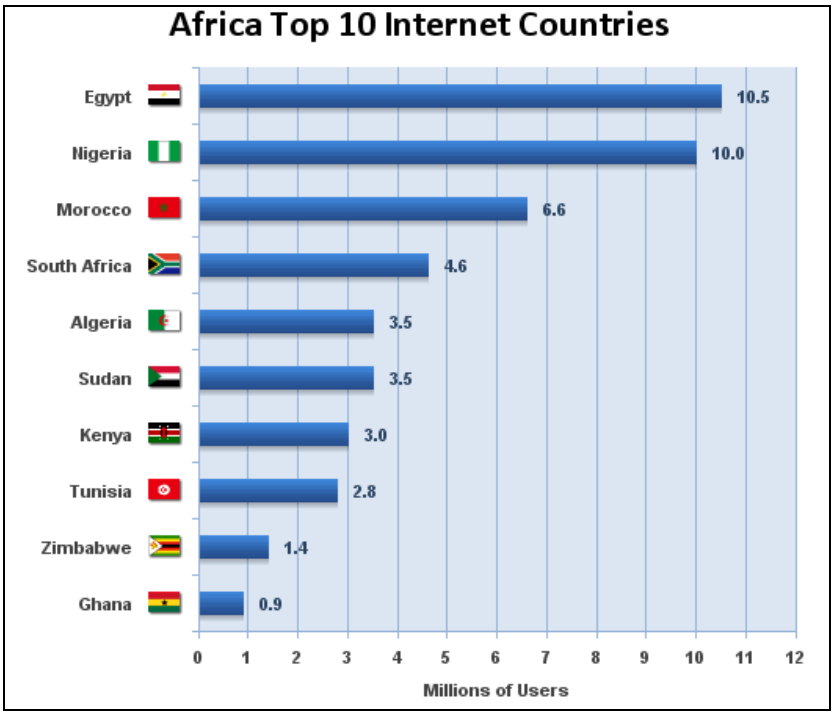
South Africa is an interesting though complicated country in Africa, and clearly shows the coexistence of “first” and “third” world. Before 1994, apartheid South Africa was defined by only four provinces and in these provinces were “Black Reserves” referred to as homelands. Now, after 1994, South Africa is made up of nine provinces that have both urban and rural areas, and the “Black Reserves” no longer exist. The rural areas are extremely deprived of resources and infrastructure. They represent what one might designate as a “third world country” within a country, compared with the urban areas that have resources fit to be classified as those of the “first world”. In the neighbouring vicinity (approximately 5 kilometres) of urban South African cities are townships that were underdeveloped by the apartheid government. Even the townships in the urban areas were deprived of general public service resources, education and other forms of infrastructure. Hence the “first” and “third” world then coexisted 5 kilometres apart and this is one of the challenges facing the post-1994 government in South Africa. Urban dwellers in various townships therefore share similar challenges with their counterparts in various parts of the continent, namely,

the limited access to the Internet, and this has a negative impact on the access to global knowledge.

The larger rural areas of Africa have the challenge of access to the Internet due to:

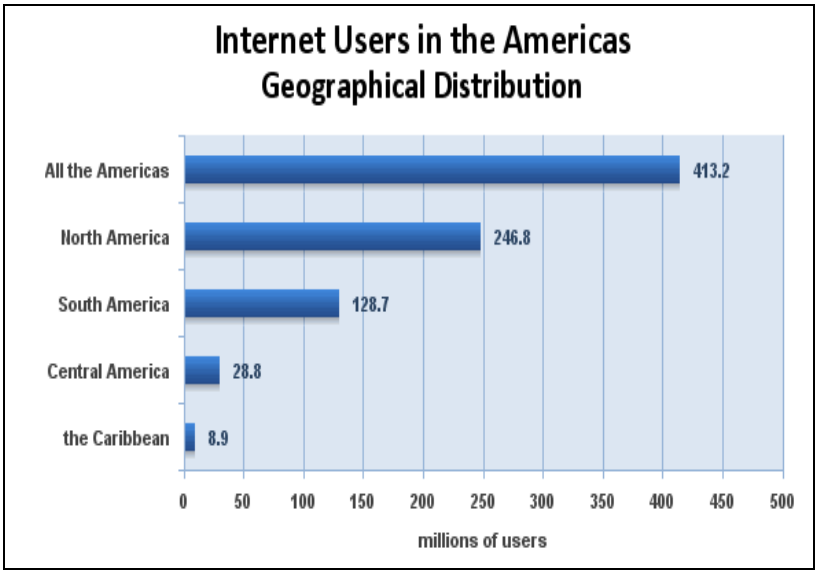
- poverty and lack of resources;
- costs of technology;
- lack of infrastructure and bandwidth challenges for telecommunication and Internet access;
- limited or no access to electricity/ power;
- low levels of literacy among many and hence a challenge with the dominant English language that is mainly used on the Internet. (It is important to note however that indigenous languages such as isiZulu and seTswana are being utilised in order to address the access issue in South Africa).

Graphs showing Internet usage in Africa and African countries



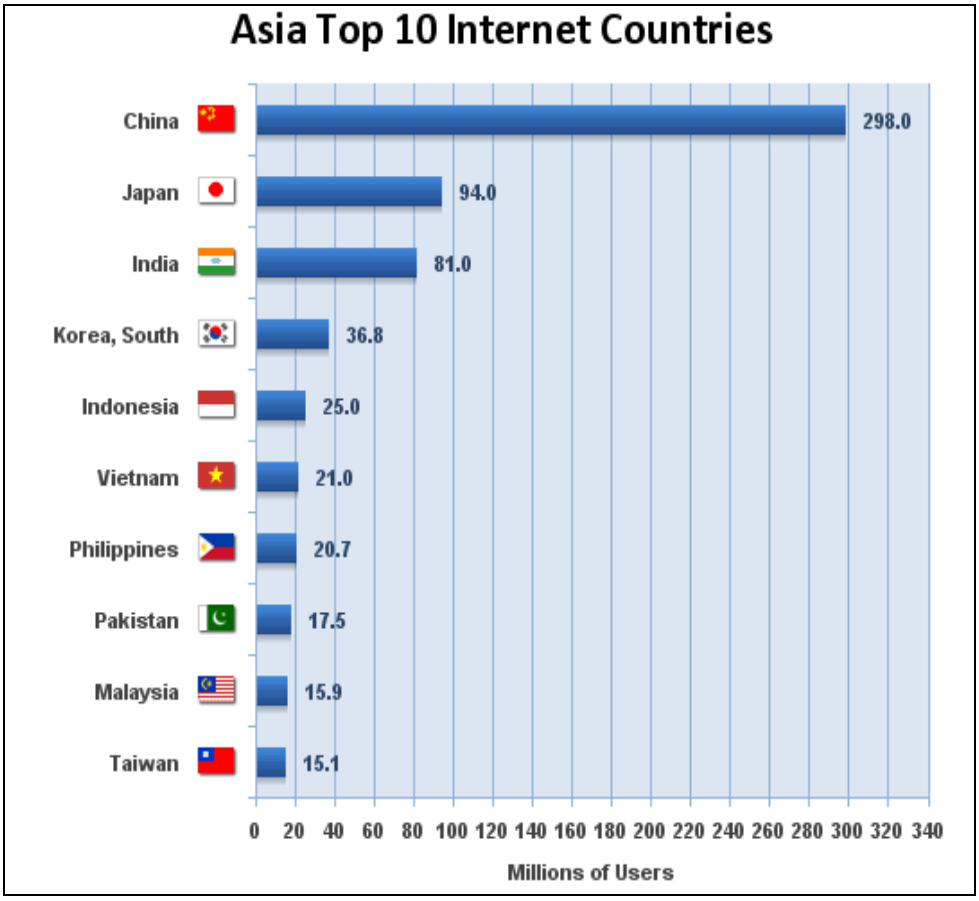
Source: Internet World Stats-www.Internetworldstats.com

The above graph illustrates Africa's top ten Internet countries. Egypt has more than 10 million users of the Internet and Ghana has less than 1million users among the top ten countries.



Source: Internet World Stats-www.Internetworldstats.com

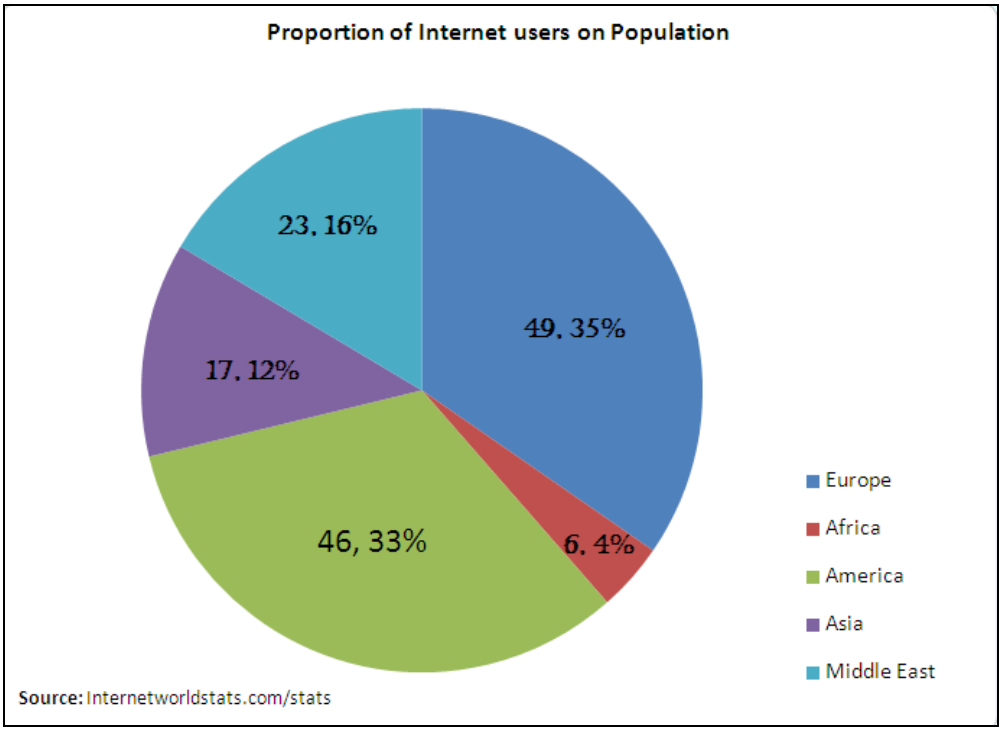
The above graph illustrates the state of America's Internet user regions. North America has the highest and the least being the Caribbean.



Source: Internet World Stats-www.Internetworldstats.com

The above graph illustrates Asia's top ten Internet user countries. China tops the rankings with more than 290 million while Taiwan has the least, approximately 15 million users.

An in-depth analysis of Africa against the world highlights the fact that in the proportion of Internet users against the continental population Africa is lagging far behind the rest of the world, with only 6.4% of its total population using the Internet. Europe has close to 50% of its total population using the Internet. This perhaps explains the notion that there is more access to global knowledge in the "first" world countries due to developed ICT and Internet access as compared to Africa. The digitization process therefore benefits the "first" world more, as they have tools to access global knowledge. The challenge remains bridging the digital divide that deprives the majority of people in Africa access to digital knowledge.



The table below illustrates the country population, urban population, Internet users and the proportion of Internet users in urban population in Africa as a continent.

COUNTRIES	TOTAL POPULATION	URBAN POPULATION	Proportion of Urban Population to Total Pop (%)	INTERNET USERS 2008	Proportion of Internet users to Urban pop (%)
Algeria	35,423,000	18,246,000	52	3,500,000	19
Botswana	1,839,000	920,000	50	100,000	11
Burkina	16,287,000	2,555,000	16	80,000	3
Cameroon	19,088,000	9,657,000	51	370,000	4
DRC	64,267,000	15,126,000	24	230,400	2
Egypt	84,474,000	31,062,000	37	10,532,400	34
Ethiopia	74,661,000	10,339,000	14	291,000	3
Kenya	35,817,000	7,384,000	21	3,000,000	41
Madagascar	20,146,000	5,313,000	26	110,000	2
Mauritius	1,297,000	525,000	40	340,000	65
Morocco	32,381,000	16,763,000	52	6,600,000	39
Nigeria	158,259,000	65,270,000	41	10,000,000	15
Seychelles	85,000	45,000	53	32,000	71
South Africa	48,073,000	25,827,000	54	4,590,000	18
Tunisia	10,374,000	6,603,000	54	2,800,000	42
Uganda	31,657,000	3,632,000	64	750,000	21
Zambia	11,738,000	3,637,000	31	500,000	14
Zimbabwe	12,475,000	4,273,000	34	1,351,000	32

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. http://esa.un.org/unup/ (2007). http://www.Internetworldstats.com/links3.htm (2007).

This table shows that in Africa, ICTs are more accessible in urban areas than the rural areas. The assumption used is that users of the Internet in Africa are mostly found in urban areas. As shown on the table above, a country like Seychelles has 71% proportion of Internet users compared to Nigeria and South Africa with 15% and 18% respectively. This is a logical scenario given the fact that Seychelles has smaller urban population compared to the two. For example, the whole population of Seychelles might represent a population of a given city in Nigeria or South Africa. Access to resources is much better when there are fewer people to share them. Seemingly, Nigeria has more Internet users, 10 million against 4.5 million users in South Africa. However the proportion to the total population indicates that South Africa has a higher proportion of users. The same analysis can be applied to the rest of the countries randomly picked and illustrated on the table above.

Possible solutions to the access challenge

All the disparities of connectivity have been shown and the way forward is to bridge the digital divide. Knowing the magnitude of the challenge one is dealing with is the first step in the right direction. Setting goals and achievable milestones and ensuring

that the resources are made available to handle projects is important. Poverty alleviation strategies that governments of African countries have put in place are going to impact the digital divide positively. No one without food and shelter will bother to access the Internet, but when this basic need is adequately addressed an escalation to the next step in terms of developmental needs will take place in that particular group of people. The solution to bridge the digital divide is not a blanket one or a "one size fits all" approach because countries, provinces, and the wards within the provinces are at different levels of development in a given country. The project has to address the relevant need at the appropriate level to be appreciated and South Africa provides us with a perfect case study.

Tried solutions in South Africa

In addressing the challenge of high cost and low penetration of fixed line telecommunication services, initiatives of providing sustainable, cost effective, shared community ICT facilities were explored, mainly for the rural communities (Tlabela et al., 2006). I will briefly describe some of the findings below:

- Establishment of public access facilities to give access to people who have no access, has been taken care of by the government through relevant departments. For example, the MPCCs (the name has now changed to Thusong Service Centres) put in place by the Government Communication and Information System. These centres are spread in all the nine provinces of South Africa, with an aim of bringing government information and services nearer to the people in rural areas. Free Internet access is provided with time limitations to allow sharing.
- In an attempt to promote access to ICT, the Telecommunications Act 103 of 1996 (South Africa 1996), as amended in 2001, mandated the Universal Service and Agency of South Africa (USAASA) to promote universal service and universal access in under-serviced areas of South Africa. Through a partnership with Digital Partnership, USAASA is rolling out refurbished computers to schools in disadvantaged areas of South Africa (Tlabela et al., 2006).
- Connecting Public Information Terminals (PITs) at Post offices throughout the country. Some rural areas still do not have post offices. The PIT is a multimedia kiosk that provides access to ICT. The installation of this technology is still in progress in various areas of the country.
- The use of Public Libraries and the National Library to access the Internet is being explored. Most libraries in the urban areas already have Internet access to search other catalogues in addition to theirs, and even search information for the users. Other libraries already have Internet stations for users to do their own searches. Libraries are still being established in most rural areas and are still offering the bare basic sources of information. The legislative bodies of the library and information sector should advise government and policy makers, e.g. library associations and/ or the statutory

National Council of Library and Information Services to expand these services, which should be provided free of charge.

- The private Internet café sector is growing at a high rate, particularly in urban areas. This should be encouraged but be regulated because the needy who have no access to Internet are the very ones made to pay high costs to access the Internet in these privately owned establishments.
- Relevant policies encouraging promotion of information and knowledge access should be in place and be regularly reviewed for sustainable relevance.
- Education is the pillar of access to information and knowledge. Reading is a level of literacy. Inculcating the culture of reading is important in bridging the access divide.
- Grants and other forms of donations can be accepted to contribute to training and skills development. The challenge is that they are not sustainable. Donations of computers should be screened before being accepted because they might be obsolete.
- There is a need for committed and competent professionals to run these projects with excellence.
- The participation of all relevant institutions at various levels is invaluable.

Current technological innovations

- Current technology is succeeding in connecting people through the Internet and cellphones over wireless global network. The penetration and growth of cellphone use in Africa is very high. This technology can therefore be used to share some information and knowledge on a smaller scale; the small screen is not friendly to the eyes with large volumes of information. The marketing sector is fully utilising the technology.
- Technology in social networking is exploited with more interest, unlike general knowledge. Mxit chat rooms keep young people glued to their cellphones, communicating faster and cheaper on wireless Internet. Access to Waptrick.com to download music is fully exploited with MP3s.
- When geographic information is combined with voice, video and search, a global dynamic trading and connectivity cloud is established.
- As we are watching, the eastern seaboard undersea cable with a capacity of 1.3 terabytes per second is due to come online. By the end of 2010 Africa should have access to over 10 terabytes of bandwidth (Seacom, June 2009).
- Ondari-Okemwa (2004) has cited the recent development of the African Digital Library (ADL) available at http://www.africandl.org.za, with a collection of approximately 8,000 e-books exclusively for the residents on the continent of Africa.

Conclusion

This paper highlights the advantages of digitization including maximum global information and knowledge sharing towards a better life, but the challenge brought about by the digital divide deprives many developing countries in Africa

from enjoying access to global knowledge. Using South Africa as an example, possible solutions were highlighted to show how relevant stakeholders have been involved in handling the challenge. Accessibility to global knowledge is a broad aspect impacted both positively and negatively by various factors including socio-economic factors, education, library and information services and commerce. The participation of all relevant stakeholders then becomes important to achieve success.

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