UNEVEN ACCESS TO NEW TECHNOLOGIES -A PARADOX OF CHANGE IN SOCIAL INEQUALITIES
By

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Abstract

The opportunities created by the process of globalization have opened clear avenues for development, but in some cases, its benefits have not been equitably distributed technologically, thereby impeding efforts to promote the advancement of social equality. Meanwhile, the information revolution and the extraordinary increase in the spread of knowledge have given birth to a new era--one of knowledge and information which effects directly economic, social, cultural and political activities of all regions of the world, including Nigeria. Through technologies such as DVDs, laptop computers, storage media, Internet, satellite TV, cellular telephones, and videoconferencing; globalization creates spectacular opportunities for increasing the dissemination of information and dialogue. But, there is a drastic inequality of accessibility of networks between the urban and rural dwellers. However, this paper examines the social inequality attached to the jagged accessibility of new technologies among rural dwellers in Nigeria. Exchanging information among people promotes the sharing of ideas, values, collaboration and knowledge production but the means by which these social advantages can be of importance are unevenly distributed in the local communities. This paper observes the factors causing technological divide between the urban areas and rural areas in Nigeria, which has drastically reduced the social actions and development among the dwellers, and even in the community. It easy to identify technology as a unifying force, bringing together various cultural uniqueness, peoples and thought patterns via channels of global networks but it is disheartening to know that network inequality between rural and urban areas has dwindled the level of social services available to rural masses. Thus, this study intends to x-ray the empowerment of rural inhabitants in the spatial hierarchy creating public access points and community connectivity.

Keywords: Globalization, new technologies, community, social inequality, digital divide.

Introduction

"Technology is like education – it enables people to lift themselves out of poverty. Thus technology is a tool for, not a just a reward of, growth and development (UNDP, 2001:27); while social thought has gained little by attempting to generalize about 'cyberspace', 'the Internet', 'virtuality'. It can gain hugely by producing material that will allow us to understand the very different universes of social and technical possibility that have developed around the Internet" (Miller & Slater, 2000:10).

This indicates that globalisation refers to the growing sense of interconnectedness between all parts of the world and the associated feelings of powerlessness and insecurity

in the face of the spread and scale of global change. It is a process (or set of processes) which embodies a transformation in the spatial organization of social relations and transactions – assessed in terms of their extensity, intensity, velocity and impact – generating transcontinental or interregional flows of activity, interaction and the exercise of power (McGrew, 2000).

However, the integration of the world economy through the world economy through the progressive globalization of trade, technology and finance has reached unprecedented levels, surpassing the pre-World War I peak. The new wave of globalization is having far-reaching implications for the social and economic well-being of citizens in all regions and is the subject of active public debate. We have entered the 21st century with no consensus among social scientists and other social analysts as to what the future holds for the bulk of humanity in terms of politics, economics, and social issues. The terms "globalization" and "new world order" have been bandied about and certain assumptions have been made by some about these terms and processes with often only superficiality lying behind the "buzz words". This should come as no surprise as there has never been a consensus about the "world order" of the 20th century itself and the post World War II period in particular. This does not mean that some truths have not emerged but rather that conflicting ideologies have undermined wide acceptance of the research information available. In order to illustrate my position I want to focus on a paradoxical change of social inequalities in the rural areas in comparison to urban areas from the perspective of uneven access to ICTs -- their extent, their causes, and their consequences.

Globalisation, a process whereby owners of capital are enabled to move their capital around the globe more quickly and easily, has resulted in the removal of state controls on trade and investment, the disappearance of tariff barriers and the spread of new information and communications technologies. The opportunities created by the process of globalisation have opened clear avenues for development, but in some cases its benefits have not been equitably distributed, thereby impeding efforts to promote the advancement of women, particularly those living in poverty. The unequal access to information and communication technologies (ICTs) has been termed the digital divide. This digital divide exists at various levels including within countries, between countries and within groups of nations. Africa is presently at the bottom of the ICT ladder. This has serious implications both for the continent as well as globally. This is because ICTs are propelling the economies of those countries that are ICT-rich faster compared to those that are ICT-poor, thus further widening the development gap between Africa and the industrialized world.

The realization of the importance of ICTs in economic development led the UN Commission on Science and Technology for Development (UNCSTD) to devote the years 1995-1997 to the study of the linkages between ICTs and development. One of the practical results of that effort was the placing of the digital divide on global development agenda. Since then, there has been a consensus internationally that there is the need to bridge the digital divide. Flowing from this consensus, there have evolved various bridging strategies, actions and initiatives at international, regional, continental and local country levels. Learning from these efforts, African countries under the leadership of the

United Nations Economic Commission for Africa (UNECA) have been developing national, subregional and continental initiatives to overcome the digital divide and to promote the greater inclusion of African communities into the cyberspace.

The major step in the African Initiative was the ECA Conference of Ministers responsible for economic and social development and planning, held in May 1996. The meeting passed resolution 795 (xxx) entitled "Building Africa's Information Highway", which committed member countries to the building of national information and communication networks. It also established a high level Working Group on Information and Communication Technologies, which was to prepare an African Strategy for the Information Age. The report of that committee called the "African Information Society Initiatives (AISI)" (UNECA, 1996), which was subsequently adopted. It provided the template for the various National Information and Communication Infrastructure (NICI) plans put up by many of the countries. Both AISI and the NICI plans have provided the core of the African ICT initiatives, including the bridging strategy as contained in the New Partnership for Africa's Development (NEPAD).

Uneven diffusion of technology and inequality in access to technologies are evident in different ways with significant consequences for social, economic and political development. These consequences are reflected in the fact that concern over the digital divide now focuses on resulting 'digital exclusion'. 'Digital exclusion' extends the idea of digital divides based on connectivity and access to emphasize ideas of exclusion or lack of participation and representation in more advanced ICTs. The digital divide has been analysed using ratios of average per capita penetrations of hardware in developed and developing countries ('Bridging the Digital Divide', ITU 2004). However, this analysis is based on averages in the categories of developed and developing countries, so the ITU's conclusion that the digital divide is shrinking depends upon the classification of countries used. Further, it does not take into account the size of the underlying populations involved and the greater absolute numbers of people with more limited access to ICTs in developing countries, and ignores strong evidence that digital divide is differentiated by the form of technology (UNCTAD, 2003).

A striking feature of globalization is the very fact of social change expressed in a "multiplicity of transitions" occurring simultaneously at several and in some cases mutually contradictory levels. These multiplicity of changes occur in different ways for different economies, different cities and different agents within them. The effects, which can either be positive or negative, are manifest in a wide array of contexts—from the social and cultural to the economic, environmental and political. While one section of humanity is growing and developing as a result of integration to global markets, the other wallows in increasing despondency and despair, including in those parts of the world that are believed to have benefited enormously from both technological globalization and economic globalization.

However, this study aims at the social inequality linked to the toothed access of new technologies among rural inhabitants. It is limited to Internet and mobile telephony among other new technologies in Nigeria because of their wide coverage. The data were

drawn from the archives, journal papers, newspaper reports, e-journals, documents of international organizations and other secondary sources because of the nature of this study. It seeks to assess the factors responsible for the technological divide between the urban areas and rural areas in Nigeria. It provides a coherent explanation on the empowerment of rural areas in articulating what needs to be done to speedily bridge the digital gap to foster access points and community connectivity.

Overview of the Nigerian Digital Divide

Figure 1: Map of Nigeria

The first ICT initiative in Nigeria started in the 1950s with focus on print and electronic media. No major policy or other outcome was achieved because of strict government control. The full awareness of the importance of ICTs was absent. Only the private sector demonstrated ICT initiatives (Emadoye, 2002). The Obasanjo administration in 2001 established the National Information Technology Development Agency (NITDA) to

serve as a bureau for the implementation of National Policy on Information Technology. NITDA is trying to increase the Internet penetration levels in Nigeria. On the other hand, the telephone system in Nigeria has been having for years. In July 2003 and under the democratically elected government of General Obasanjo, the Nigerian Communications Act 2003 (GOVN, 2003) was passed into law. This act, in addition to reforming the NCC, also created the National Frequency Management Committee, with the main responsibility of managing the country's radio-frequency spectrum resources. A breakthrough in telephone infrastructure emerged in January 2001 when the sector was totally liberalized with the licensing of MTN and ECONET (mobile phone company). They injected over a million lines into Nigeria within a year. Also Globacom came into existence later. The Global System of Mobile Communication (GSM) is spreading in a highly competitive manner from state to state and city-to- city. The advent of GSM has greatly enhanced the exchange of information but the local communities are still bewildered with little or no connectivity of breakthrough that ICTs have brought.

Digital Divide, defined as the unequal access to information and communication technologies (ICTs) by the various communities, has today become a major issue of concern to all. The reality of the digital divide has been well documented by several reports (see for instance, ITU, 2001, 2002, USIC, 2000, Bridges.org, 2001, OECD, 2001). Contained here, are the highlights of the statistics as they affect Africa in which Nigeria is inclusive. The Divide has various dimensions. At the international level it is the concentration of ICTs and services in the industrialized countries of the North, with little of them in the countries of the South, especially African countries. The table below shows the trends of mobile telephones subscribers worldwide between 2001 and 2005:

Table 1: Growth in Number of mobile telephone subscribers, 2001-2005

	Mobile Subscriptions	Mobile Subscriptions	Absolute change	% Change	Source of growth
	2001	2005	2001-2005	2001-2005	2001-2005
Developing Countries	388 674 941	1 167 050 600	778 375 659	200.26	65.28
Africa	26 091 686	134 296 038	108 204 352	414.71	9.07
Asia and Oceania	278 511 819	793 375 236	514 863 416	184.86	43.18
Latin America and the Caribbean	84 071 436	239 379 326	155 307 890	184.73	13.03
Transition economies	22 325 131	185 068 576	162 743 445	728.97	13.65
Developed countries	553 610 317	804 830 507	251 220 190	45.38	21.07
World Total	964 612 390	2 156 951 688	1 192 339 293	123.61	100.00

Source: UNCTAD summary based on the ITU World Telecommunication/ICT indicators database.

Mobile connectivity is very much responsible for the current surge in ICT utilization and as such, introduces science, technology and knowledge (STK) inputs into value-creation processes in various sectors of the economy. But the concern is unevenness of the distribution of the connectivity in the nation; especially in the rural area. Though, there is

a sparse longitudinal research to overview the mobile connectivity in rural areas in Nigeria, yet it could be affirmed through the level of growth and development in those areas compared to urbanized environments. However, mobile telephone technology has enabled relatively low network build-out costs and these have resulted in the rapid growth of mobile telephony to the point where it is growing significantly faster than fixed telephony, both globally and in Nigeria.

Table 2: Total Connected Lines and Teledensity (1999-2005) in Nigeria

OPERATOR	Fixed	Mobile	Total	Teledensity
Dec 1999	473, 316	35, 000	508, 316	0.45
Dec 2000	553, 374	35, 000	588, 374	0.51
Dec 2001	600, 321	266, 461	866, 782	0.73
Dec 2002	702, 000	1, 569, 050	2, 271, 050	1.89
Dec 2003	872, 473	3, 149, 472	4, 021, 945	3.35
Dec 2004	1, 027, 519	9, 174, 209	10, 201, 728	8.50
Dec 2005	1, 223, 258	18, 587, 000	19, 810, 258	15.72

a. Source: www.ncc.gov.ng
b. Teledensity was calculated based on population estimate of 126 million people.

According to an ITU report (NCC, 2005), the telecommunications sector in Nigeria has the fastest growing mobile telecommunications market in the world. Growth in this sector is typified as shown in Table 2, by total fixed line capacity, which increased from 473, 316 in 1999 to 1, 223, 258 in 2005. During the same period, connected mobile lines increased from total of 35, 000 in 1999 to 18, 587, 000 by December 2005. No doubt, this exemplifies rapid growth but can we say rural is as urban? The population estimate for the calculation of the teledensity as at 2005 was 126 million (recent population estimate is more than 150 million) but the problem with the figures is that there were no computational comparison between urban areas and rural areas in the findings. So, it is problematic to ascertain the portion of the rural areas from the findings. But, it could be depicted by virtue of logical reasoning that the remaining could comprise large percentages of rural dwellers and small proportion of urban inhabitants (107, 413, 000).

Be as it may, these new technologies came to be seen as synonymous with development, making the main goal of development to connect as many people as possible to the Internet as quickly as possible. Conversely, the main problem of development became the fight against inequality of access to information and communication technologies (Wilson & Heeks, 2000:418-419). This is not to say that discussion of the potential of the Internet has been unequivocally positive. From the beginning, concerns were raised about the uneven diffusion of these technologies in developing countries, and the potential for exclusion from, rather than inclusion in, the new global and local scenarios shaped by the emergence of ICTs.

There is a very high risk that these technologies and services will deepen the disadvantages of those without the skills and capabilities to make the investments required for building innovative ' knowledge societies"(Mansell & Wehn, 1998:1). It was also clear that the obstacles to achieving widespread Internet access by the populations of

poorer countries were deep-seated and multidimensional, including not only problems of physical infrastructure such as the availability and affordability of access to the telecommunications network, the cost of buying a computer, and the higher costs of providing Internet services in these countries, but also issues surrounding human capital (literacy, English language skills) and pre-existing social exclusions (for example on the grounds of age, gender or ethnicity, or simply poverty) (Mansell & Wehn, 1998; Panos, 1998).

Vividly, it could be pictured that uneven access (digital divide) occurs basically when advances in modern technologies in information and communications, like the Internet, mobile telephones etc are not reflected in the lives of a people on at least two identifiable sides of a divide; usually between a privileged and a less privileged group and specifically, for this study, people in Nigerian regions (both urban and rural communities) who albeit are considered fundamental components of human interaction in today's world. Meanwhile, Information and communications technology (ICT) was noted by Peters (2003) as a key weapon in the war against world poverty. When used effectively, it empowers people in developing countries and disadvantaged communities to overcome hindrances in development; address important social problems and strengthen communities, which will result in democratic institutions, a free press, and local economies. ICT development in Nigeria so far is wholly dependent on foreign technologies. The emerging technologies such as broadband satellite, Internet, VSAT and wireless telephony was noted by Olorunda and Oyelude (2003) to provide wonderful opportunities for Nigeria to leapfrog to the information age. But, the problem cross-linked to this niche is the jagged accessibility of these new technologies among the rural dwellers in all the six geo-political zones in Nigeria. Without mincing a word, there is a far gap between the urban and rural areas in respect to ICTs and this is the genesis of paradoxical changes of social inequalities.

Carlos Fortin, averred that "the digital divide between the information-rich and the information-poor is of increasing concern. A major challenge for policy-makers at the national and international level, therefore, lies in addressing the issue of digital divide between rich and poor countries, rural and urban areas, men and women, skilled and unskilled citizens, and large and small enterprises" (UNCTAD, 2004, p. iv). Digital divide between countries is basically calculated by the number of telephones, computers, and Internet users and measured in terms of race, gender, age, disability, location and income between groups of people within countries (Peters, 2003). It was defined as the unequal access to Information and Communication Technologies (ICTs) during the first World Summit on the Information Society (WSIS) held in Geneva in December 2003, (Wimax, 2005). It was observed that unequal access is not only peculiar to differences between developed and developing countries, it could also apply within countries (the domestic digital divide) and significantly between the rural and urban sectors.

Access to information opens doors to wider economic and social development opportunities. The significance of information to enhance economic development cannot be overemphasized considering the fact that information is power. The ability to have accurate and timely information will enable efficiency and increase skill (Olorunda,

2004). The lack of technological infrastructure in developing countries impedes economic growth, but limited to access to telephones, not today's wider concept of Information and Communications Technologies (ICTs) access and usage (Wimax, 2005). The International Telecommunications Union (ITU) initiated a United Nations project for the Right to Communicate in 1996, focused on providing access to basic ICTs for all, in order to reduce information poverty for developing countries. ITU published a press release on June 16th 2005, favoring partnership as the key to connecting communities. The initiative, a global multi-stakeholder effort established within the context of the WSIS and named **"*connect the world*"** is meant to encourage partnerships to bridge the digital divide.

Currently, telecommunication penetration in Nigeria is in excess of 12 percent of population with about 17.5 million active telephone lines (Punch, 2005). While the existence of information does not necessarily ensure its use, the real value of an information system lies in the servicing of specific user needs. In order to solve this problem, and elevate the country technologically, with socio-economic development and also create a new lease of life for the population, a planned increase in penetration of telecommunications services has been seen as a welcome development for national growth. (Adeyinka, 2001).

From the foregoing, providing access to technology is critical, but it must be about more than just physical access. Computers and connections are insufficient if the technology is not used effectively because it is not affordable; people do not understand how to put it to use; people are discouraged from using it; or the local economy cannot sustain its use. ICT projects will only be widely successful in developing countries when all of the other components necessary for the effective integration of ICT into society are in place (Peters, 2003). Virtually, information has become one of the primary inputs in economic processes and new technologies have gradually become more important for the ability of enterprises, communities and individuals to participate successfully in the global economy, (Hollifield and Donnermeyer, 2003). Ideally, Internet cafes in developing countries represent reasonably priced access points to sources of information for personal development, business start-up and growth, or political participation and the progress of civil society.

Luyt (2004) notes that Internet technology is not evenly distributed around the world and as a result, the problem of the digital divide is an issue in international circle. Nigeria was named as one of the Sub-Saharan African countries dominating the lower rankings of ICT diffusion; with 161 in 2002, it indicates that Africa still has a considerable way to go in connectivity and ICT diffusion to hold its own with other regions (UNCTAD, 2004). As the table below shows, sub-Saharan Africa, along with South Asia, remain at the bottom of the list of developing regions in Internet usage surveys around the world, while South Asian Internet use is growing more rapidly.

Table 3: Internet Users as percentage of Total Population

Region	1998	2000
United States	26.3	54.3

| Region	1998	2000
High-income OECD (excl.US)	6.9	28.2
Latin America and the Caribbean	0.8	3.2
East Asia and the Pacific	0.5	2.3
Eastern Europe and CIS	0.8	3.9
Arab States	0.2	0.6
Sub-Saharan Africa	0.1	0.4
South Asia	0.04	0.4
World	2.4	6.7

Source: UNDP World Development Report 2001

The divide between the urban areas and the rural areas is even greater. Most of the services and users are concentrated in the towns, while the majority of Africans are scattered in small communities spread-out across the vast rural areas. Very limited perfusion of the telecommunication networks into rural areas (often over 75% of the country's telephone lines are concentrated in the capital city) and irregular or non-existent electricity supplies are a common feature and a major barrier to use of ICTs, especially outside the major towns. Furthermore, most tax regimes still treat computers and cell phones as luxury items, which makes these almost exclusively imported items all the more expensive, and even less obtainable by the majority.

The Trends of Uneven Access—A Global Perspective.

The recent ITU report (ITU, 2006), avers that access to information and communication technologies continues to grow at high speed and the digital divide – in terms of mobile subscribers, fixed telephone lines and Internet users - keeps getting smaller. ITU statistics show that by the end of 2004, the telecommunication industry had experienced continuous growth, as well as rapid progress in policy and technology development, resulting in an increasingly competitive and networked world. There are more ICT users worldwide and more people communicating than at any other time in history. By the end of 2004, the world counted a total of three billion telephone subscribers, 1.8 billion mobile subscribers and 1.2 billion fixed lines. Both, the number of mobile subscribers and the number of Internet users more than doubled in just four years. By end 2004, the world had over 840 million Internet users, which means that on average 13 percent of the world's population was online.

It is true and encouraging, that overall, the digital divide has been reduced. The statistics show that within four year, from 2000 to 2004, the gap separating the developing and the developed countries has been shrinking in terms of mobile subscribers, fixed telephone lines and Internet users. It measures the gap (the digital divide) by dividing the ICT penetration rate in the developed world by the ICT penetration rate in the developing world. Phenomenal growth rates in the mobile sector, particularly, have been able to reduce the gap from nine in the year 2000, to four by the end of 2004. This gap has also been reduced in terms of fixed lines, from six to four, and from 15 to 8 in terms of Internet users.

Figure 2: Digital opportunities are growing…
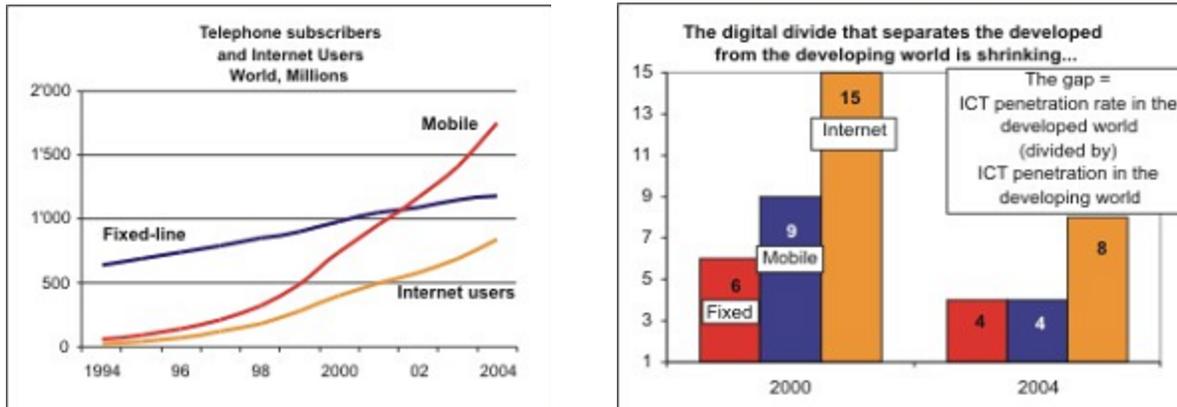
At the same time, the world continues to be separated by major differences and disparities in terms of ICT levels. In 2004, almost one third of the population in Europe (29%) and the Americas (28%) was online, compared to eight percent in Asia Pacific. Europe has almost 15 times the Internet penetration of Africa, where less than two out of 100 people use the Internet. Internet penetration also remains below world average in the Arab States, where less than six out of 100 people are online.

High growth rates in some areas, and particularly the mobile sector, are not sufficient to bring digital opportunities to all and many developing countries risk falling behind, particularly in terms of Internet access and newer technologies such as 3G and broadband. The introduction of high-speed Internet access is of great importance for the transformation of Information Societies since it opens up new possibilities and visions on how the Internet can provide a platform for enhancing countries' social and economic development. This is why it is disturbing that the vast majority of broadband users are in the developed world. Of the world's broadband subscribers, no less than 97 percent are located in Asia-Pacific, Europe and North America. Africa, and the Arab States, particularly are lagging behind and many countries have not yet commercially launched high-speed Internet services.

Figure 3: ..but major disparities remain and uneven access must be addressed
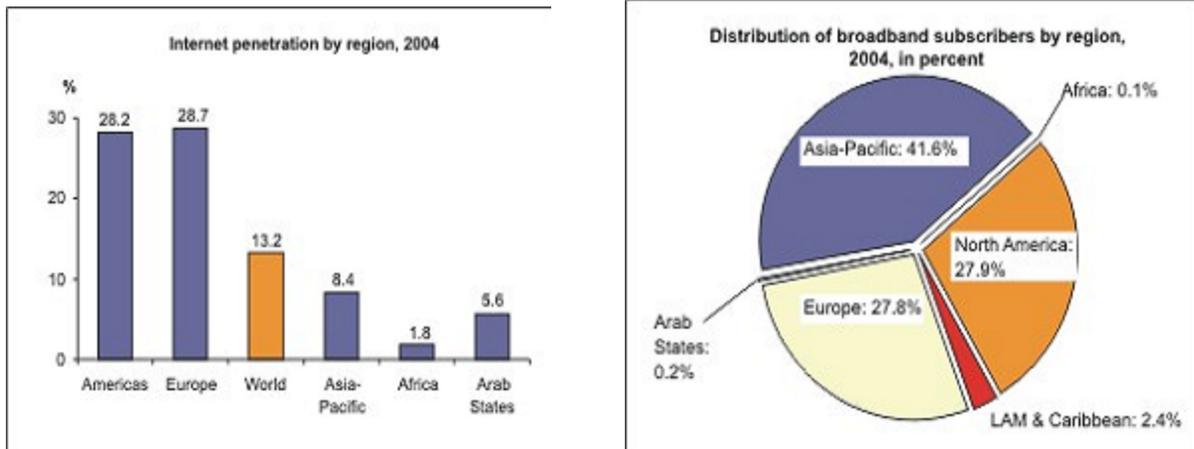
It is important to counteract such a new technology divide, particularly since broadband is playing a crucial role in transforming countries into Information Societies. ITU research shows that some of the applications that are having the greatest impact on people and businesses are closely linked to broadband uptake. Since access to basic communications in the developing world has largely been achieved through mobile communications, broadband wireless access (BWA) is expected to play a key role for developing countries seeking to foster the Information Society. The report highlights that the mobile boom by itself is not enough, and increasing efforts must be undertaken to take advantage of the great potential offered by these new technologies.

As I have said earlier about the comparison of the data between the urban and rural areas seem problematic, the ITU report also indicated the lack of and need for impact indicators. The lack of comprehensive, timely and comparable data remains a major barrier to analyzing the status and progress of information societies, identifying reliable targets and adapting policies. The world has made some important progress in agreeing upon a common set of Information Society access and usage indicators and efforts continue to improve the availability and comparability of core Information Society indicators. But, measuring access to, and use of, ICTs is not enough, particularly since it has been widely recognized that ICTs are not an end in themselves (ITU, 2006).

The Causes of the Technological Divide

The information revolution has brought with it a digital divide phenomenon as a central problem of the contemporary world. However, this is not an independent phenomenon, but an integral part of the structure of inequality at all levels: international, regional, national, and local. Digital divide tends to reproduce the basic elements of the structure of inequality along the lines of traditional patterns of socio-economic stratification. Policy makers in the world community are facing enormous challenges emanating from the uneven distribution of telecommunications infrastructure between countries, and between urban and rural areas. Despite the global consensus on the dramatic developmental

potential of the information and communication technologies, emerging technological hubs in urban centers of some countries in Europe, Asia, and Latin America (with few experimental exceptions in rural areas) exacerbate the existing peripheralization of vast territories of the world and their population. Most of Africa, Latin America, vast landlocked parts of Asia, significant areas of the former Soviet Union, and Eastern Europe are technologically excluded.

The pattern of technological diffusion is parallel to other forms of capital flow and marked by uneven global economic integration and development indicators. Therefore, people living in peripheralized regions are trapped in a vicious circle and face severe constraints for development. The lack of infrastructure, energy grids, international bandwidth, and the high costs of access and equipments are the main constraints to providing international communication technology to the rural masses, and even to some urban centers. In addition to this basic lack of physical infrastructure, the limited human and institutional capacity, outdated or weak regulatory frameworks are common to most parts of the peripherilized territories. Furthermore, rural economic sectors, and small and medium scale industries have not been properly connected to the national and regional chains of production and services, and thereby into the global economic system. The informal sector in the developing economies has been largely deserted. Sound backward & forward linkages are totally non-existent.

Be as it may, the divide between the urban areas and the rural areas are even greater. Most of the services and users are concentrated in the towns, while the majority of Africans are scattered in small communities spread-out across the vast rural areas. Very limited perfusion of the telecommunication networks into rural areas (often over 75% of the country's telephone lines are concentrated in the capital city) [Sources: ITU, UNESCO] and irregular or non-existent electricity supplies are a common feature and a major barrier to use of ICTs, especially outside the major towns. Furthermore, most tax regimes still treat computers and cell phones as luxury items, which makes these almost exclusively imported items all the more expensive, and even less obtainable by the majority. Although there have been notable efforts in some countries to reduce duties on computers, however communications equipment and peripherals are still often charged at higher rates.

Another systemic factor is that the road, rail and air transport networks are limited, costly to use and often in poor condition, resulting in barriers to the increased movement of people and goods, needed both to implement and support a pervasive ICT infrastructure, but also for the increased economic and social activity which would be stimulated through greater use of ICTs. Congested border posts and visa requirements add to these difficulties. Perhaps, an even greater problem is that the brain drain and generally low levels of education and literacy amongst the population has created a great scarcity of skills and expertise (at all levels, from policy making down to end-user). Rural areas in particular suffer with even more limited human resources. Along with the very low pay scales in the African civil service, this is a chronic problem for governments and NGOs who are continually losing their brightest and most experienced to the private sector. This situation is not unique to Africa or other developing countries, but is also being faced by the developed world where infrastructure demands have outpaced the supply of

experienced staff. However this is simply exacerbating the situation in Africa, because experienced technicians, even from the local private sector, are able to find much higher paying jobs in Europe and North America.

The general business climate for increased investment in Africa, acutely needed for the ICT sector, has suffered from the well known problems of small markets divided by arbitrary borders, non-transparent and time-consuming procedures, limited opportunities (due largely to the historic pattern of monopolies and high levels of state control), scarce local capital, currency instability, exchange controls and inflation. Although the relatively low level of ICT penetration amongst the public in Africa has so far limited the use of ICTs for governance purposes, many administrations are beginning to streamline their operations and improve internal efficiencies by adopting ICTs within the organisation. Not quite long, the government of Lesotho declared that all announcements for cabinet and committee meetings would be made only by email. Some administrations such as those in South Africa, Algeria and Tunisia now provide immediate global access to tenders via the web. Health and education departments in many countries are beginning to electronically transmit operational MIS statistics such as disease occurences and pupil registrations. In South Africa, the results of blood tests are being transmitted to remote clinics that are off the telecom grid via mobile telephone text messages. As greater numbers of public officials are now gaining low-cost access to the web, the vast information resources available via Internet are becoming increasingly important tools in ensuring informed decision-making.

Lack of timely information is well-known to be the largest constraint on small-scale agricultural production and natural resource exploitation - a sector that provides livelyhood for 70-80% of Africa's population. However so far, the potential for ICTs to impact this sector has not yet received much attention. Local farmers or miners often cannot obtain up to date market information, so travelling traders can negotiate low prices. With improved information systems they would be able to obtain much better market-related prices. Taking a step further, farmer and fishing organisations are able to band together to sell their produce directly to distributors, and negotiate for better prices on inputs.

However, there are problems associated with focusing simply on access as the yardstick of a successful experience with ICTs. As Beamish (1999:364) comments, although access to ICTs is now accepted as being inarguably important for low-income communities, here is a lack of clarity as to why this should be so, and indeed as to what communities might be expected to achieve as a result of this access. Sanyal & Schön (1999:377) stressed that "even if access is provided to low-income communities, it is unclear whether it will be enough to integrate them into the nation's mainstream economic, political and social life". A substantial increase in the rate of expansion and modernisation of fixed networks is taking place, along with the explosion of mobile networks. The number of main lines grew about 9 percent a year between 1995 and 2001, however this is off a very low base - the overall fixed line teledensity as of 2001 is still only about one per 130 inhabitants in Sub-saharan Africa (excluding South Africa), and taking into account population growth, the effective annual increase in lines is only 6%. Also, most of the existing telecom infrastructure cannot reach the bulk of the population - 50 percent of the available lines

Fig 1: Growth of Internet use in Africa
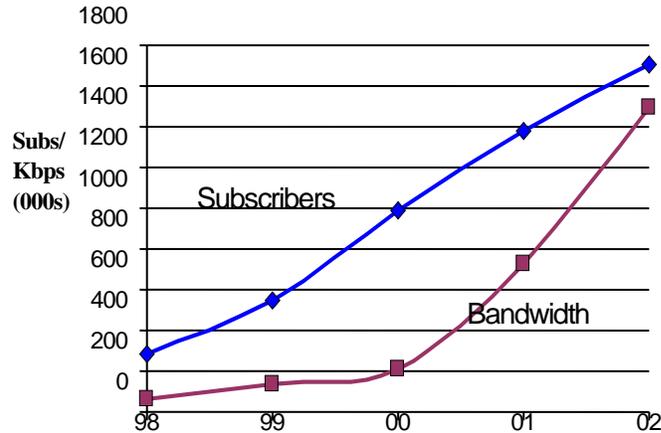
are concentrated in the capital cities, where only about 10 percent of the populations live. In over 15 countries in Africa, including Cote d'Ivoire, Ghana and Uganda, over 70 percent of the lines are still located in the largest city (ITU Report, 2002).

Also, most estimates for the number of personal computers in Africa put the total at about 7.5 million for 2001 — an average of about 1 per 100 people. But due to limited capacities for industry monitoring and the large numbers of machines smuggled in to avoid duties, these figures are notoriously unreliable. Some studies, such as the ACCT (1995) survey, indicate that official figures may be an overestimate by between 3 and 6 times, making the average closer to 1 per 500 people. Account should also be taken of the number of users sharing a single computer, which is much greater than in the more developed regions. Underutilization of existing computer resources is also common, often caused by the preponderance of many stand-alone computers in the same office with no use of Local Area Networks (LANs). Often an office may have many machines, but only one with a modem connected to the Internet. This usually means that there is competition for the machine and a shared email account, which is not conducive to effective use of the Internet. More generally, the high cost of computer hardware is a major issue as this is often the largest component of their startup budgets. This situation is likely to become an even more critical bottleneck now that low-cost bandwidth is becoming increasingly available, such as through Ku-Band VSAT and spread spectrum wireless (WiFi) links. As a result increasing attention is being directed toward the use of recycled PCs, thin clients, set-top boxes, or other low-cost Internet 'appliances', and Open Source (free) software for these situations.

The use of the Internet is a good indicator of the availability of ICTs as it requires the integration of many of individual components of ICTs – computers, telecommunications infrastructure and the skills to use them. the As the graph below shows, both the number of Internet users and the amount of international bandwidth is still growing strongly across the continent. In Africa, the pattern of Internet diffusion has been similar to that of

the mobile telephone networks. Although not quite as widespread, the Internet preceded the mobile phone explosion, having had greatest impact at the top end of business and in wealthy families, primarily in the major urban areas. Ironically, the non-profit sector – the academic institutions and the NGOs pioneered the use of the Internet in the early 1990s, fueled by their need for low cost international communications. Subsequently, it was taken up by private Internet Service Providers (ISPs), and most of the national telecom operators. Because of the large number of shared accounts, along with the relatively high and rapidly growing use of public access services such as Telecentres, and cybercafes it is difficult to measure the total number of Internet users. Although the number of dialup subscriber accounts is readily available, these figures are only a partial gauge of the size of the Internet sector and should be looked at along with other factors such as the quantity of international traffic each country generates.

Shared or public access and the use of corporate networks is continuing to grow at greater rates than the number of dialup users. This can be seen in the deployment of international Internet bandwidth, which is still expanding substantially — up over 100%, from 700 Mbps of available outgoing bandwidth in 2001 to 1500 Mbps in 2002. However, this is still slower growth than the rest of the world, which averaged 174% in 2001. No studies have been made in Africa of the number of rural versus urban users, but it is safe to say that users in the cities and towns vastly outnumber rural users. Although many African countries now have points of presence (POPs) in some of the secondary towns, (about 280 different locations across the continent), this still means that most rural users have to make a costly long distance call to connect to the Internet. However some countries have now instituted local call charges for all calls to the Internet regardless of distance, which greatly reduces costs for those in remote areas and greatly increases accessibility and the viability of Internet services provided by rural Telecentres in these nations.

Perhaps an even greater problem is that the brain drain and generally low levels of education and literacy amongst the population has created a scarcity of skills and expertise (at all levels, from policy making down to end-user). Rural areas in particular suffer with even more limited human resources. Along with the very low pay scales in the African civil service, this is a chronic problem for governments and NGOs who are continually losing their brightest and most experienced to the private sector. This situation is not unique to Africa or other developing countries, but is also being faced by the developed world where infrastructure demands have outpaced the supply of experienced staff. However, this is simply exacerbating the situation in Africa, because experienced technicians, even from the local private sector, are able to find much higher paying jobs in Europe and North America. The general business climate for increased investment in Africa, acutely needed for the ICT sector, has suffered from the well-known problems of small markets divided by arbitrary borders, non-transparent and time-consuming procedures, limited opportunities (due largely to the historic pattern of monopolies and high levels of state control), scarce local capital, currency instability, exchange controls and inflation.

Social Inequality And Uneven Access

Here, the pattern of ICT access may reflect innovation diffusion in general, where at least initially, new innovations exacerbate societal disparities (Rogers 1995). Rogers (1995) interprets the process of innovation diffusion, as follows. In general, initial access to new technologies, especially high-cost innovations, is limited to those with advantageous status and resources (income, white-collar work, elite institutional locations, educational level, race, urban residence and gender). Such users are also likely to have greater exposure to mass media and interpersonal communication channels, are highly interconnected in the interpersonal networks of their system, engage in more active information seeking, and have greater knowledge of innovations (Rogers1995:433). When compared to innovation diffusion in general, the variation in ICT access, and the resulting social inequalities, are similar to those outlined by Rogers (1995). At least initially, barriers to ICT access include class, gender and employment status. However, other barriers such as age, household type, geographical location, ethnicity, and disability have been identified (NOIE 2002).

How the concept of a 'digital divide' relates to persistent social inequalities is becoming less clear. Different levels of the 'digital divide' have been identified both in terms of access and ownership of the technology, and the expertise and technical skills associated with effectual use of information from the Internet (Bucy 2000). Even at the level of access, the concept looses usefulness when the pattern of digital inequality is crosscut by other forms of inequality. These complex relationships are perhaps not captured well by the notion of a 'divide'. Although inequalities still exist, the 'digital divide' concept does not help advance understandings of the complex problem of digital access. Further, these debates are not purely analytical as "governments everywhere legitimate much of their policy in terms of a technological imperative" (Wajcman 2002:348). Rhetoric and discourse about ICT and the 'digital divide' reinforce and frame these very arguments (Wajcman 2002).

Early visions were optimistic that ICT would facilitate the replacement of existing patterns of class, race and gender social inequalities. Essentially the Internet was seen as an equalising agent. ICT access, and the associated information and knowledge acquisition, crosscut or blurred previous inequalities based on property and capital. Inequality then became multidimensional, where new forms of social privilege and exclusions were based on access (and use) of ICT. The monopolies and networks of information were eroded and decentred, and where instead information became available to everyone, everywhere via the Internet. Often entailing technological rhetoric and excessive optimism, these claims are difficult to substantiate.

Many people are actually suffering in different ways--I would say not from globalization itself, but from the failure to manage its adverse effects. Some have lost their jobs; others see their communities disintegrating, some feel that their very identity is at stake {UN, 2000}. The most significant aspect of ICTs and globalization that should concern the developing countries like Nigeria is the fact that it has led to unprecedented inequalities in the distributing of benefits between developed countries and the less developed.

Present day globalization is not new because history shows that a similar trend was witnessed in the 19th century and the earlier part of the 20th century {Adeboye, 2000}. What is different is the intensity and the magnitude of the inequalities that it generates. In all these developments, there is the underlying assumption that globalization is good for all and that its benefits are shared out (even if not equally) all over the world. The more developed countries benefit while the least developed countries tend to remain impoverished and do not share in the benefits. The combined effect of the global fluidity of finance capital, the growth of foreign direct investment, and the emergence of global corporations have greatly undermined the economic and political sovereignty of states-- especially the poor ones.

Technological gaps and uneven diffusion in technology are not new. "Older" innovations such as telephony and electricity are still far from evenly diffused - but what may be unprecedented is the potential size of the opportunity costs and benefits forgone by failure to participate in the new 'digital society.' Growth in the use of ICTs is highly uneven. There are significant disparities in access to and use of ICTs across countries. Developing countries risk being left further behind in terms of income, equality, development, voice and presence on an increasingly digitalized world stage. The image of globalization as a promise or threat is, in fact, one of the most powerful and persuasive images of our times {Veseth, 1998}. Yet, despite the vast literature on this subject and the ongoing discussion, globalization remains an ill-defined concept. Some view it as the international system that has succeeded the end of the Cold War, while others prefer to continue using the term "internationalization" to describe the current changes in the international economy. Though there is some agreement among scholars and experts that globalization is producing greater interconnections and interdependence, there seems to be little consensus on the degree of integration it engenders and on its pervasiveness. Different views have emerged on this issue.

High technology can also put unequal human beings on an equal footing, and that makes it the most potent democratizing tool ever devised. But it is hardly realized that globalization benefits different countries differently, the more developed countries taking the lion's share of the benefits while the least developed tend to be impoverished and by-passed by the benefits. It may be said that two different worlds co-existed. One was the world of the rich nations whose population had ample access to education, health services, clean water, unemployment benefits, and social security. The other one was the world characterized by abject poverty with a lack of education, no access to health services and a lack of basic infrastructures to deliver social services. The combined effect of the global fluidity of finance capital, the growth of foreign direct investment (FDI), and the emergency of global corporations has greatly undermined the economic (political) sovereignty of states especially the poor ones. It is necessary to highlight certain pertinent issues that must be addressed in any discussion on globalization. UNDP in 1999 reproduced figures to show that the gap between the richest and the poorest countries in per capita income terms was only 3:1 during the dawn of the Industrial Revolution in 1820, rising to 11:1 by the first episode of globalization in 1913. More recently, it grew to 35:1 in 1950, rising slightly to 44:1 by 1973. After the commencement of the present round of globalization, this figure has acquired a

staggering magnitude of 71:1. Accompanying this widening gap is the grave human cost in terms of malnutrition, morbidity and mortality {Murshed, 2000}. It is estimated that those living in abject poverty number over 700 million, the majority of whom are in Sub-Saharan Africa and East Asia. Since the beginning of the 1980s, most African countries have been facing severe economic crisis. Most macro-economic indicators have been pointing downwards. This is why it is important for Africa and Nigeria in particular to be aware of the implications, and be prepared to meet its challenges.

In particular, it masks a concern with more utopian approaches and their failure to consider the context of technological innovation. To conceptualize technology and technological change outside of any social, economic, political or cultural context, can have several consequences. The first is that the approach becomes one of technological determinism, where the technology is seen to act as an agent that has an effect on other social systems. Such accounts ignore the social shaping of technologies, and the fact that technologies and social life are interconnected (Schmidt 2001:1; Groper 1991). These approaches disregard the political, social and cultural processes that necessarily accompany the development of any technological innovation, not least in the forms of values, judgments and interests in operation that help structure Internet access and use (MacKenzie and Wajcman (1999). Rather than overriding previous patterns of social inequality, or merely reinforcing structured patterns of inequality, a third more nuanced possibility is that ICT facilitates both the reinforcement and cross-cutting of social inequalities. Here, there will be uneven effects through domains of education, work and production, economy, politics, trade and space. Thus new relationships have the potential to both alter existing class, gender, age and racial inequalities and also open up new inequalities (Walby 2000).

Although there is increasing participation by women in higher education, and an increasing exposure to ICT skills, the benefits for women from investment in technical skills are mediated by age and workplace employment (Walby 2000:814). If women obtain well-paid employment in stable jobs, inequalities of education (and possibly income) are reduced. However, if women merely replace unpaid domestic work with poorly paid unstable jobs then the form of inequality is merely replaced. For elderly women, who are not participating in lifelong learning and who are perhaps out of paid employment, inequality based on education may be increased. As Walby (2000:814) argues: "This opens up new inequalities among women that are often correlated with age. These changes cross-cut those traditional divisions between women based on ethnicity and class, producing yet further diversity in the patterning of inequality"

Such inconsistencies in women' s access to ICT continue. Women have been encouraged to express unexplored aspects of the self and to try out new identities through digital communications (Turkle 1995). Issue-based social movements have similarly been an area where access to ICT has proven advantageous for women. Although access to new ICT allows cultural expression and new cultures to emerge, digital opportunities are still restricted for women (Sassen 2002:376). In the engineering, design and programming of the Internet, gender (and race) biases in communication and technology are replicated. Rather than being gender neutral and encouraging participation these aspects of the

Internet may increase inequalities based on the sexual division of labour (Butler 2000, Wajcman 2000).

Finally, spatial distributions of ICT and infrastructure may further stratify ICT access and result in divisions that overlap with existing divisions of district, rural, urban, region and nation. Rather than overcoming limitations in accessing information, Internet infrastructure have been concentrated in rich and predominately white regions and only subsequently extended to poorer, smaller and rural communities. ICT then "contributes to new and more complex forms of corporate integration, reinforcing center periphery problems on a global scale" (Gillspie and Robins 1989:7), thus, causing new forms of global subordination and domination between cities and regions. Differential diffusion of Internet access occurs when most of the world's population lacks basic access to a telephone, let alone a computer (UNESCO 1998:88-95).

In assessing experiences with public access points, it is also particularly important to consider what people themselves want from ICTs, and whether access to improved communications services may be considered as a form of development. From a human development perspective, this is clearly the case: "access to information and the capacity to interact and network with distant others can clearly increase choice and empowerment" (Featherstone, 2000:216). According to a Panos report (1998), the popularity of the Internet, and particularly e-mail, in developing countries can be attributed to the fact that it allows for reliable, quick, efficient and cheap communication, which is nothing short of revolutionary when placed in context.

Empowering the Rural Masses

Communities could be empowered through education/knowledge, equal economic opportunity/revenue/income, provision of basic amenities, good governance, reformation of the way government and its institutions work at all levels and localities, poverty eradication, security and participation, improving social inclusion, provision of technology access community centers etc. The empowerment of rural inhabitants in Nigeria is basically dwindled with literacy level, network access, provision of infrastructures etc. Meanwhile, the involvement of citizens at various stages is critical to success (equal citizen participation). However, the rural dwellers must be the centre of planning, not ICTs alone. Harnessing new technologies require awareness raising and constituency building. Sustainability of realistic timeframes, sufficient training and access to infrastructures (telecommunications, mobile telephony and power), computing equipments, socio-cultural issues (e.g. gender equity), human capacity, technical capability, and information flows.

True ICT for development (meeting the MDGs) initiatives need to move beyond access to infrastructure, enabling environment and e-strategies; need to pay attention to cultural diversity, linguistic diversity, gender, local content, open source software and ethical dimensions such as privacy, communication rights .The vision of the right to communicate has become a legitimate extension of fundamental human rights in the information age. And this implies that affordable ICT access and mobile telephony

should also infiltrate the rural communities to improve the socio-economic empowerment needed in order to guarantee the social equality. Effective regulation, research and analysis of policy intentions and outcomes and effectiveness of strategies in Nigerian context (third world context) are essential to moving from ad hoc, ineffectual, short-term decision-making process to building viable information communities. In reality, this kind of informed policy and effective regulation requires capacity and this in turns requires effective training to understand the rudiments of public access points and community connectivity.

Recommendations

For ICT to have a positive impact on development, there needs to be, at the very least, extensive, affordable and equitable access, as well as sufficient human and technical capacity, a supportive business and policy environment, and the production of relevant content and applications to deploy for example, ICT in health and education. However, by making ICT an integral part of development cooperation and solutions for assisting countries to address the digital divide, development agencies, and public-private partnerships at the global and national levels can contribute to lessening the social and economic inequalities of which the digital divide is itself a reflection. They can also contribute to meeting the international development targets, given the potential of ICT to impact development positively (UNDP 2001).

From my own point of view, my recommendations below also complement the global frameworks and components suggested by the International Research Foundation for Development; translated into the WSIS declaration and aftermath implementation programs around the world during the world summit on the information society in Geneva 2003 and Tunis 2005 respectively (IRFD, 2003). The framework contains a vision of sustainable development and peace. These two components should be treated in an integral manner. One cannot be achieved without the other. The fundamental principle in this vision is to strive for a global information society based on an egalitarian foundation. Thirdly, the main objective is to create and use ICT to bridge the global disparity in its entirety. These are the new technological mantras that are expected to foster the social equality and even access to new technologies in both rural and urban areas:

- o **Provision of Infrastructure**

This approach should include projects aimed at constructing the minimum level of main roads and access roads. Provide primary health care centers, and basic sanitation infrastructure. Provide adequate numbers of primary and secondary schools with minimum ICT facilities. Provide electricity grids for rural areas in the developing world and the least developed countries. Provide alternative energy sources such as solar and biogas. Establish a global broadband satellite infrastructure as outlined by the International Telecommunications Satellite Organization

- o **Public Access Centers and Cyber Communities**

The empowerment of people living in rural and urban centers in the spatial hierarchy creating public access points and community connectivity-telecenters and cyber parks should be high priorities in national strategies. One practical solution which has emerged in dealing with the multidimensional problem of access to the Internet by poor

communities is that of the telecentre, defined most simply as a "shared site that provides public access to information and communications technologies" (Proenza 2001). It has gained the support of the international development community because it seems to offer the possibility of a significant impact and progress towards ' universal access' in a relatively short period of time, without heavy investment. The following steps should be taken:

A national governmental informational strategy has to be designed to negotiate the private sector's co-sponsorship to support Program of Public Computer Sites. Priority should be given to remote rural townships where public roads and transportation systems are insufficient or totally absent. Public Computer Sites of these rural townships should be an extension to public schools and public government agencies such as municipalities, cooperatives, peasants' organizations, and public health centers. Public educators or teachers should be trained to help disseminate the basic computational skills and expertise. ICT should be applied for distance education to educate paraprofessionals in all sectors such as health, agriculture, environment, and industry. Student centered educational delivery systems should be introduced linking main universities to regional open universities and cyber communities. Design software programs on specific educational topics for populations with low literacy levels.

- **Establish a vertical and horizontal communication grid**

It is necessary to connect major cities, regional cities, urban centers, and rural towns through vertical and horizontal communication grids to deliver effective and efficient services and provide citizens with wider public access through national and global network systems. Transform Congested Cities into Cyber Cities and connect them to the vertical and horizontal network centers. This provides a framework for techno-global transformation, which will increase global consciousness originating from the grass roots. This is an indispensable necessity to empower the grass roots to mitigate the unilateral process of metropolitan linkages, which mainly serve the interests of multinational corporations.

- **Establish an Integrated Development Framework**

The digital divide could jeopardize all efforts by governments all around the globe to establish an efficient and effective e-Government environment. Therefore, governments should take a coordinated effort of an awareness building of the importance of user acceptance of new ICT technologies. Imparting technological skills in the areas of governmental service and participatory activities must be embedded in this coordinated effort. This will enhance the citizenry involvement and participation in the e-governance.

- **Use ICT to develop healthy triangular partnership between Governments, Private Sector, and Civil Society.**

Innovative public-private-civil society partnership is necessary to install regional broadband satellite infrastructure, participate in the physical network construction and service provision. This innovative triangular institutional structure should go beyond the national boundaries to inform each other of problems, constraints, and best practices.

- **Transfer of Technology and Intellectual Property Rights**

Ensure efficient access to technology with affordable prices and preferential terms for the less developed countries. This would facilitate the containment of infringement and allow for the protection of Intellectual Property Rights.

- **Promote inter-cultural dialogue and cultural hybridization using ICT**

There are two tendencies in ICT application with regard to the cultural domain and development: Culture has a pivotal role in development efforts thus an appropriate blending is necessary. However, on one hand, there is a tendency of hegemonic domination in cultural hybridization. On the other hand, there is an opposing trend to hegemonic domination, which will result in the resurgence of the cultural and religious fundamentalism. A two prong approach is necessary to avoid these dialectic tendencies: i) take measures to prevent inter-cultural, inter-caste, inter-religion, inter-ethnic, and inter-racial animosity and rivalries; ii) create an environment of healthy diversity and productive hybridization which will reach a high point of human creativity and equality in every segment of the world. This two-prong approach needs very comprehensive ICT educational programs to build equality consciousness to overcome destructive identity politics. This new form of knowledge should be ingrained in all segments of population. Communication policies should reflect a pluralist vigor to promote the flowering of cultural diversity. Formulating a coherent policy, in consonance with a 'holistic' understanding of information society can assure dignity to every human being irrespective of her/his creed, culture, heritage and language and irrespective of their innovative intention to integrate diverse cultural views and practices into their own lifestyles and this will go along way to eliminate the paradoxical change in social inequalities.

- **Create Gender Oriented ICT Policy**

A gender oriented ICT policy framework must include measures to eliminate institutionalized gender inequalities, and provide rapid access to resources, education, skills, and markets. ICT policy must rest on the understanding that technology must be adapted to fit the needs of both rural and urban poor women in order to have an impact on their economic status and improve their living conditions. Rural agricultural women and urban informal sector women should have technological skills and access to their respective stock of information (agricultural and market information), and health and educational information on a constant basis. This information access must be built by taking into account their daily community interaction network. Application of ICT to the existing community interaction network will enhance their social capital base utilizing the various opportunities offered by the information society.

- **Human Rights in an Information Age**

In the age of information society the world must have common knowledge and a shared vision about human rights. There is a need to emphasize the need for formulating this shared vision transcending local content. The world must rise above the fundamentalism and cultural revival, which undermine human equality and dignity. On the other hand, hegemonic domination in the name of 'international human rights', and its patronage package, manipulation and oppression of people in peripheral territories must be wiped out. This new human rights knowledge must include all the issues pertaining to racial, ethnic, sexism, and ageism. Specific necessities and rights of women, youth, children, disabled, migrants, internally displaced people have to be seriously addressed and necessary steps must be taken.

- **Promote Democratic information and Global Governance**

This revolves round the advocating of a policy for the improvement of existing structures and mechanisms that will enhance the openness and transparency for effective

participation of all segments of society and will channel input into the local, national, and international process of decision making.

- **Create Healthy Economic Climate for IT Industry**

The IT industry, as one of the major building blocks of the new economy, requires a healthy, more stable international financial environment in order to maximize its potential to improve the productivity and living standards of people in all countries. It is necessary to take steps to mitigate current negative financial economic climates, which is dominated by stock market volatility, accounting corruption, terrorism, and trade barriers etc.

- **Apply ICT for Sustainable Development**

Application of ICT may create new environment hazards. Therefore, in view of mainstreaming ICT into sustainable development, the action plan should include concrete proposals and policies to develop renewable energy resources, particularly for remote communities; improve resource efficiency; dematerialize and reduce waste; increase the useful life of hardware; improve recycling conditions; ensure safe disposal of discarded ICT hardware and parts and encourage the development of alternatives to toxic ICT components.

- **Apply ICT to increase the productivity efficiency of small and medium scale industries.**

Promote linkages between SME and FDI thereby integrating them into the global production process. Provide e-finance for SME. Increase awareness and equipped medium and small scale exporting firms to harness the potential of e-commerce, and to create efficiencies and productivity gains.

- **Promote comparative inter and intra-country policy research and institutionalize ICT**

Mobilize academic personnel, policy makers, planners, and practitioners to assess and analyze the impact of ICT on the developing world and economies in transitions. In other words, study the process and inner dynamics of ' information society.' Policy research should be done within an integrated scientific framework, which encompasses economic, social, cultural, and political fabrics of these countries. This scientific approach should bridge theory and practice to shed light on practical development considerations and peace making.

- **Promote International cooperation**

International cooperation cannot be achieved without introducing a holistic approach. ICT can play a vital role in setting a solid premise for an innovative approach. As stated earlier, a true bottom up global consciousness can be instilled through dense networks across regions. The strength of this global consciousness eventually should challenge the deep-seated mistrust at various political layers of the world.   There are several steps towards setting an agenda for global public policy. The first step is to define a set of principles that should guide the transition towards a global information society. The second step is to mobilize a global force to democratize the existing international institutional (economic and political) structure. Third step is to transform/replace undemocratic regimes through the local and national forces. Conventional international geo politics and hegemonic global and regional dominations are the dangerous forces that challenge true international cooperation. The alliances based on narrow geo politics and power games have to be challenged through ICT applications. ICT should not be solely

in the hands of the privileged segments of the world. Unless and until the world bridges the digital divide and challenges the undemocratic international and regional power structures, in addition to the even development and peace will not be achieved.

- o **Need to strengthen Civil Society participation in global policy formulation**
Building an institutional mechanism in line with the existing rules and procedures to allow certain levels of negotiation rights and channeled input both from the representatives of the private sector and Civil Society is a plan of action that can foster technological progress and effect social equality.

Conclusion

The early pattern of digital inequality appears to have altered over time, although without longitudinal data, we need to be cautious with these comparisons. Some divisions between users and non-users of the Internet have persisted, whilst other gaps have been more transient or narrowed. There is both overlap of digital inequality with gender and class inequalities, and crosscutting or transformation along the dimensions of education and age. Diffusion patterns have thus become more nuanced, with neither democratisation nor reinforcement forecasts endorsed at this stage. As persistent features of digital inequality, class and gender divisions overlap or replicate existing structural patterns of social inequality. Gender however, appears to be a hidden dimension of digital inequality, especially in relation to crosscutting class inequalities. These relationships clearly require further study.

As well as overlapping existing social inequalities, Internet diffusion alters established patterns of advantage, and is associated with the formation of new patterns of social privilege. This is evident for both education and age. Although the advantage of educational status persists, and there is a marked advantage of tertiary education for male Internet access, the importance of educational status for women is much weaker. Initially very stark, age barriers to Internet access remain. With computer and Internet skills acquired through higher education and training, young people continue to be advantaged in relation to Internet access. Although age is more important for access among men, gaps between younger, middle aged and elder citizens persist.

Having explored the divides of new technologies in Nigerian communities, a global view of digital divide, causal organisms of technological divide and a call for empowerment of rural inhabitants in the spatial ladder of creating public access points, telecenters and community connectivity; however, these complex and often contradictory expressions of digital inequality challenge the notion of a 'digital divide'. This study therefore advocates for the need for a digital metric that can account for the shady relationships between social inequality and Internet diffusion in Nigeria and other developing nations because new technologies such as mobile phones, computers and Internet connections, can only have transformative roles (social gains, economic gains, dynamic equality) to the societies (both rural and urban societies) if they are accessible and affordable—a feature that seems not to exist in Nigeria and other African countries.

References

Adeboye, Titus. {2002}. "Globalization: How Should Nigeria Respond"? NISER Occasional paper. No.2. Ibadan, Nigeria Institute of Social and Economic Research. pp. 2-9.

Adeyinka, F. M. (2001). Technological response to telecommunication development: A study of firms and institutions in Nigeria. African Technology Policy studies Network. Nairobi, Kenya.

Beamish, Anne (1999) "Approaches to Community Computing: Bringing Technology to Low-Income Groups", in D. Schön, B. Sanyal & W. Mitchell (eds.) High Technology and Low-Income Communities: Prospects for the Positive Use of Advanced Information Technology (Cambridge, MA & London: MIT Press).

Bucy, Erik P. (2000) "Social Access to the Internet" Harvard International Journal of Press Politics 5 (1): 50-61.

Butler, Deborah (2000) "Gender, girls and computer technology: what's the status now?" The Clearing House 73 (4) Mar/April: 225-229.

de Alcantara, Cynthia, Hewitt, 2001: The Development Divide in a Digital Age: An Issues Paper, UNRISD Programme Papers on Technology, Business and Society PP TBS 4, August 2002.

Featherstone, Mike (2000) "Technologies of Post-Human Development and the Potential for Global Citizenship", in J. Nederveen Pieterse (ed.) Global Futures (London: Zed Books).

Gillespie, Andrew and Kevin Robins (1989) "Geographical Inequalities: The spatial bias of the new communications technologies" Journal of Communication 39 (3) Summer: 3 21.

Hamelink, C.; "ICTs and Social Development: The Global Policy Context", paper presented at the UNRISD Conference on Information Technologies and Social Development, Geneva, June, 1998.

IBRD/World Bank (2000) 'Rural access to information and communication technologies: the challenge for Africa'

International Parliamentary Union (IPU), 2002: www.ipu.org (Accessed 11th February, 2008).

ITU (2002) World Telecommunication Development Report. ITU. Available at: http://www.itu.int/newsarchive/wtd/2002/survey. (Accessed 7th February 2008)

ITU (2006) World Telecommunication /ICT DIV. Report 2006. Measuring ICT for Social and Economic Development. http://www.itu.int/ITU-D/ict/publications/wtdr_06/. (Accessed: 26th February, 2008)

ITU (2003) World Telecommunication Report.htpp://www.itu.int/ITU—D /ict/publications/wtdr_02/. (Accessed: 3rd February, 2008)

Jensen, M. (1998). Africa Internet Connectivity: Information and Communication technologies (ICTs) Telecommunications, Internet and Computer Infrastructure in Africa. Retrieved from The Association for Progressive Communications Website: http://www3.sn.apc.org/africa/ (Accessed: January 29th, 2008)

MacKenzie, Donald and Judy Wajcman (1999) (eds) The Social Shaping of Technology Philadelphia, PA: Open University Press.

Mansell, Robin and Steinmueller, Edward (2000) Mobilising the Information Society. Oxford: Oxford University Press.

Mansell, R. and Uta Wehn, 1999**:** Knowledge Societies: Information Technology for Sustainable Development, Oxford University Press, New York

Miller, Daniel & Slater, Don (2000) The Internet: An Ethnographic Approach (Oxford: Berg).

Mitchell, William J. (1998) "Equitable Access to the Online World", in D. Schön, B. Sanyal & W. Mitchell (eds.) High Technology and Low-Income Communities: Prospects for the Positive Use of Advanced Information Technology (Cambridge, MA & London: MIT Press).

NCC (2005): Trends in Telecommunications Markets in Nigeria 2003/2004, Nigerian Communication Commission, www.ncc.gov.ng (Accessed: 26th February, 2008)

New Partnership for Africa's Development (NEPAD). 2001. NEPAD' s strategic framework document. Available at: http://www.nepad.org/2005/files/home.php (Accessed: 6th February, 2008).

NOIE (2002) "Digital Divide" http://www.noie.gov.au/projects/access/community/digitaldivide/Digitaldivide.htm (31/01/08).

OECD (2001) Report of Joint OECD/ UN/ UNDP/ World Bank Global Forum ' Exploiting the Digital Opportunities for Poverty Reduction' . Downloadable from http://www.oecd.org/dac/digitalforum. (Accessed: 20th February, 2008).

OECD, 2001: Understanding the digital Divide, www.oecd.org/dstu/prod/digital.

Olorunda O. O. & Oyelude A.A. (2003, August). Professional Women's Information Needs in Developing Countries: ICT as a Catalyst. Paper presented at IFLA Women's Issues Section Satellite Meeting, Berlin, Germany.

Onitiri, H. M. A. {2001} "Globalization and Africa's Development". NISER Occasional Paper. No. 2. pp.2-3.

Oniokun, Adepoju (1989), "Urban Growth and Urban Management in Nigeria", in R. Stren and R. White (eds.), African Cities in Crisis: Managing Rapid Urban Growth, Boulder: Westview Press, pp.68-111.

Panos (1998) "The Internet and Poverty: Real Help or Real Hype?" Panos Briefing no. 28, April 1998, available online at www.oneworld.net/panos/briefing/interpov.htm (site visited 19/02/08).

Patterson, P. and E.J. Wilson III (2000) "New IT and Social Inequality: Resetting the Research and Policy Agenda" The Information Society 16:77-86.

Peters, T. (2003). Bridging the Digital Divide. 28-31. Retrieved February 20, 2008 from http://www.ciaonet.org/oIj/gli_nov2003/gli_nov2003h.pdf.

Proenza, Francisco J., Bastidas-Buch Roberto & Montero, Guillermo (2001) "Telecenters for Socioeconomic and Rural Development in Latin America and the Caribbean: Investment Opportunities and Design Recommendations with special reference to Central America", FAO/ITU/IADB paper, available online at www.iadb.org/ict4dev/telecenters/ (site visited 21/02/08)

Research ICT Africa (2006), Towards an African e-Index-SME e-Access and Usage; ISBN: 100-620-37593-0.

Rogers, E. (1995). Diffusion of Innovations . New York: The Free Press

Sanyal, Bish & Schön, Donald (1999) "Information Technology and Urban Poverty: The Role of Public Policy", in D. Schön, B. Sanyal & W. Mitchell (eds.) High Technology and Low-Income Communities: Prospects for the Positive Use of Advanced Information Technology (Cambridge, MA & London: MIT Press).

Sassen, Saskia (2002) "Towards a Sociology of Information Technology" Current Sociology 50 (3) 365-388.

Schmidt, Joseph (2001) "Editors Introduction Community Networking: Mapping the Electronic Commons" Electronic Journal of Communications 11 (2): 1.

The Information Society and Development, A Review Vol. I, 12 January 2001, European Commission.

Turkle, Sherry (1995) Life on the Screen: Identity in the Age of the Internet New York:

Simon and Schuster.

UNCTAD (2004). The Digital Divide: ICT development indices 2004. United Nations Conference on Trade and Development.

UNDP [United Nations Development Program] (2001). Information and Communication technology for Development: Synthesis of Lessons Learned," Essentials, No 5 (September). [Online]. Available: http://undp.org/eo/documents/essentials_5.PDF

UNECA, May 2002 http://www.uneca.org/disd/_vti_bin/shtml.exe/nici_status.htm/map. (Accessed: 18 February, 2008)

UNECA, 1999a: Ababa The Way Forward to a People-centred African Information Society, document issued at the end of the First African Development Forum (ADF' 99) held in October 1999 at Addis Ababa, Ethiopia.

UNECA, 1996: African Information Society Initiative (AISI), UNECA, Addis Ababa, Ethiopia.

UNESCO 1988 World Communication Report: The Media and Challenges of the New Technologies Paris: UNESCO.

United Nations. 2005. The Millennium Development Goals Report 2005. Available at: http://unstats.un.org/unsd/mi/pdf/MDG% 20Book.pdf. (Accessed: 15 February, 2008)—1999.

United Nations Information and Communication Technologies Task Force (UNICTTF, 2002). Information and Communication Technologies (ICTs) in Africa—A Status Report.

United Nations. {2000}. "A Compact for the New Century {1999}". World Economic Forum, Secretary-General Kofi A. Annan, Davos, 31 January, SG/SM/6881/Rev.1.

Veseth, Michael. {1998}. "The End of Geography and the Last Nation-State, in Selling Globalization: The Myth of the Global Economy. Lynne Rienner Publishers, Boulder, Colorado.

Wajcman, Judy (2002) "Addressing Technological Change: The Challenge to Social Theory" Current Sociology 50 (3): 347-363.

Wajcman, Judy (2000) "Reflections on Gender and Technology Studies: In What State is the Art?" Social Studies of Science 30 (3) June: 447-64.

Warschauer, M. (2003). Technology and Social Inclusion. Cambridge: The MIT Press.

Wilson, Gordon & Heeks, Richard (2000) "Technology, Poverty and Development" in T. Allen & A. Thomas (eds.) Poverty and Development into the 21st Century (Open University/Oxford University Press).

World Economic Forum (2000) ' From the global digital divide to the global digital Opportunity'.

Ya' u, Y. Z., 2001: Confronting the digital divided: An interrogation of the African Initiatives At Bridging the Gap. Paper presented at the ABANTU Workshop on Gender and ICTs Policies in Africa, April 2001, Accra, Ghana.