Working Paper
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Comments Welcome

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Introduction

In Nairobi, teenagers pay one Kenyan shilling per minute to play video games at a cyber café. Signs on lampposts trumpet the latest corporate Internet service provider and businesses eagerly await the licensing of the next mobile operator. Computers, cellular telephones and the Internet contribute to the fast pace of business and urban life in the commercial capitals of Africa. Yet, in most rural areas on the continent, schools use wood and chalk, banks and government offices rely on paper records and villagers have to walk as far as twenty kilometers to find a functioning fixed-line telephone.

Information and communication technologies include both old types of technology such as radio and landline phones, as well as new types of technologies, including the Internet, I-phones, WiFi, and mobile telephony. These types of technologies often combine in unexpected forms, such as cell phones which allow you to check your bank balance, as a result of convergence. Yet, whatever the technology, most developing countries (including African countries) have inadequate access to technologies such as computers, the Internet, fixed and mobile telephone lines ("ICTs"). [a]

In response to this deficit, numerous African governments have developed formal ICT policies in their nations. According to United Nations Economic Commission for Africa (UNECA), by the year 2000, at least twenty-three African nations had developed or were in the process of developing formal ICT policies.[1] Many of the final and draft African ICT policies contain provisions concerning universal access which are directed at providing basic telecommunications services, or even more advanced Internet connections and computer-related infrastructure to remote areas.

This paper argues that these policies and provisions result partly from external pressures by donors and international organizations for greater efficiency and partly reflect the internal pressures of local consumers and businesses for improved services. Importantly, as predicted by political scientist Yaron Ezrahi in his book on the political uses of technology <u>Descent of Icarus</u>, governments use technology to demonstrate commitment to other social goals (Ezrahi, 1990).[2] Further, my research indicates that international organizations act as conduits of policy streams while local agents ensure that ICT remains on nations' policy agenda.[b] Finally, multi-stakeholder collaboration between various African states, the international non-government (NGO) community and indigenous community based organizations have transformed the universal access

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[a] According to Professor G. Ollere Ajayi, of the Federal Ministry of Science and Technology of Nigeria, Internet penetration in Africa in 2001 fell below one percent. (Okpaku, 2003)p. xi.; *see also (ITU, 2003)* p. 22.

[b] This paper relies heavily on all the reports prepared for the African Technology Policy Studies Network conference on ICT Policies in Africa. The author would like to give special thanks to the authors of the reports on Nigeria, Mozambique, Kenya, Uganda and Ghana.

concept into a tool for development and social justice illustrating the idea that technology and politics influence and create each other (Jasanoff, 2004).

Methodology and Data Collection

Research for this paper was conducted using the comparative case study method, one of the tools of comparative political science as well most other social sciences.[3] The author collected data from both primary and secondary sources.[4] The author spent appreciable time in the field over a period of two and a half years as a participant observer attending meetings regarding ICT policies with donors,[c] academics, advocates including directors of the New Economic Partnership for African Development, and government officials, including numerous Members of Parliament, Ministers, Commissioners and Permanent Secretaries. Over one hundred extensive semi-structured interviews in four African countries with key policymakers and participants in academia, government, the private sector and civil society comprise a crucial source of data. Documentary sources examined include government documents such as draft ICT policies of several African nations, final policies, legislation, regulations, government websites, and comments of stakeholders, agendas of meetings, notes, and minutes by participants in key meetings among others. The project also draws on press reports on ICT and telecommunications policy in the countries under study from both print and electronic media. Finally, where appropriate, secondary sources of data, such as journal articles, newspaper articles, and summaries of meetings, form part of the data base.

Forces for Universal Access

The deployment and diffusion of ICT in rural areas depend on choices and actions by the private sector, the public sector, and the non-governmental sector. Accordingly, national governments' efforts regarding ICT policy determine whether ICT actually achieves the desired goals of socio-economic growth and poverty alleviation. This is particularly true in the realm of universal access. Both primary research—as well as a review of the secondary research—indicates that countries with more state-led developmental approaches, such as Rwanda and Mozambique, tend to put more emphasis on universal access policies. However, there appears to be a second policy force for universal access. Countries with activist civil societies, such as Kenya and Nigeria, can force governments to incorporate at least some universal access and social justice objectives into policy documents.

The African ICT Frontier

[c] I categorize officials from the United Nations as belonging to the donor class.

Why has Africa experienced such significant policy activity in the realm of ICT policy formation and universal access? Africa represents the world's greatest ICT challenge. It has the lowest tele-density in the world and the lowest level of Internet connectivity even when compared to other developing regions such as Eastern Europe.[5] Global mobile cellular penetration reached 59.3 globally in 2008, yet was at a much lower average of 32.6 in Africa (Morshid, 2009). Similarly, although the average African Internet penetration rate hovers at a low 4.2 percent, the world Internet penetration rate is several times higher than that, at 23 percent.[6] Further, according to the International Telecommunications Union ("ITU"), there is a dramatic global broadband divide. Whereas in Europe, there are 200 fixed broadband subscribers for every 1000 people, in Africa, there is only one fixed broadband subscriber for every 1000 people. (ITU, 2009b).[7] Further, the relative price for ICT services in Africa is the highest in the world, despite the fact that the region has the lowest income levels in the world.

Strong forces, both inside and outside Africa, are pushing for this isolation to end. Activists and NGOs have focused on the promise of "universal access" as a platform for ensuring the diffusion of ICTs to remote areas. In a trend toward policy collaboration, domestic ISP and telecommunications providers in some African countries have determined that supporting universal access policies may also be a way to broaden markets and access new customers.

Even as the content of ICT expands and shifts, debates rage regarding "how" ICT should be implemented, where infrastructure should be built and who should pay for rural access. Universal access policies, usually contained inside of formal ICT policies, encapsulate these debates. The questions of how to implement this technology, who should benefit from its introduction to Africa and where specific components of ICT technology should be located cannot be limited to simple technological considerations, nor for that matter, can decisions be made on purely political grounds. Rather, as Ezrahi (1990) and Jasanoff (2004) have argued, both technology and politics play a role in determining how technology will expand its reach.

Efforts to harness this new technology through policy have not emerged from a vacuum. Behind the push to develop ICT policies in Africa lies the belief that ICT may have a beneficial impact on society. In addition, advocates often believe that technology can lead to progress. Politicians and technocrats believe that they have a chance at controlling these new innovations. The emerging movement of "ICT for development," known as "ICT4D" reflects the view, prevalent since the Enlightenment, that technological change is invariably a force for social progress. As scholars Leo Marx and Merritt Roe Smith have noted (Smith & Marx, 1994), part of our conception of the "modern" is the vision that technology can act as an agent of social change. A strong political vision, such as that present in Rwanda, can dramatically affect who gets ICT, when they will get it and for what purposes the technology will be used. Technology can drive social change; yet, technology also responds to social pressures.

Getting ICT on the Agenda

How did the issue of ICT as a tool for development land on the African policy agenda in the first place? The appearance of universal access, and indeed, ICT Policy, as a potential development issue results from the convergence of two policy streams in the mid-1990s. First, international institutions such as the International Telecommunications Union (ITU), the World Trade Organization (WTO) and the World Bank encouraged reforms in African telecommunications markets in an effort to push nations towards a free market model. Simultaneously, civil society actors, such as the Association for Progressive Communications, and E-ThinkTankTz positioned telecommunications as an equity and social justice issue. The first movement towards universal access legislation was the wave of telecommunications reform in the last decade. Market reform led to the creation of new institutions and organizations in the telecommunications arena in African states. This reform took on three distinct aspects: legal and regulatory change, privatization, and governmental reorganization.

Many countries such as Uganda, Kenya and Tanzania began this reform process in the late 1970s by unbundling their postal services from telecommunications. In addition to privatization and legal reform, many countries enacted sweeping re-organization efforts. The 1990s witnessed the formation of numerous new governmental bodies and agencies in the information sector. A pattern of splitting the telecommunications regulator from the regulated entity emerged. The mid 1990s witnessed another massive wave of telecommunications reform.

In 1997, sixty-nine governments consented to a World Trade Organization proposition that they liberalize their domestic telecommunication markets and open them to foreign competition beginning in 1998. Much of this reform movement was part of externally driven macroeconomic structural adjustment programs which attempted to move African nations toward free market economies. Indeed, the 1990s were a period of frenetic activity across the continent in terms of legal and regulatory change. During this period, many nations such as Ghana, Nigeria, Mozambique and Kenya enacted telecommunications policies. By the advent of the new millennium, many African nations had a liberalized cellular telephony market, although fixed-line provision remained largely in the hands of state-run monopolies.

One straightforward benefit of promulgating ICT policy in African countries, is that, done well, ICT policy makes Africa safe for multi-national, regional and domestic capitalism. The primary growth in ICTs comes from the private sector. Government in the ICT sector has an important role: to facilitate an enabling environment for investment, and subsidize and encourage infrastructure and access in rural areas so that all citizens can benefit from this new technology. Supporting clear, comprehensive, ICT policies which support innovation and competition is an easy route for governments to promote economic growth within their borders, and in their region. What is at stake in ICT policy for both the average small business person and the consumer in African rural areas? The items at stake are no less important than access to information, jobs, markets, and money.

Reshaping Universal Service for a New Millennium

Liberalization was not the only important trend taking place in the telecommunication sector during the 1990s. At the same time that markets were opening in Africa under pressure from Western donors, politicians and activists in the United States were looking for technology to provide new answers to old social problems. These efforts were characterized by a rhetorical shift worth reviewing in the context of universal access in Africa. The concept of "universal service"— once a technocratic matter of interest only to regulators and telephone companies — was transformed into a tool for social change.

The concept of universal service has gone through several expansions. Initially, however, universal service was not about equal resource distribution to under-served groups. Milton Mueller has written that universal service subsidies began in the mid-1960s in an effort to manipulate jurisdictional cost separations to keep local telephone rates low (Mueller, 1997). Telephone companies encouraged the creation of a narrative that portrayed monopoly rents and regulatory subsidies as the source and means for universal household penetration. This narrative attempted to enshrine the social value of publicly provided subsidies for private sector telecommunications companies. Eventually, argues Mueller, universal service also came to stand for the idea that all homes in the United States should have access to telephone service. In a moment of rhetorical transformation, the policy entrepreneurs of the 1990s concerned about the digital divide picked up one aspect of this theme -- widespread distribution of an "old" information technology -- to argue that the traditional telephone based definition of universal service should be expanded to include personal computer and modem use (McConnaughey, 1999). It is this expansive view that has found its way into African ICT policies.

This inclusive and equitable definition of universal service has been adopted and transformed by African governments and policy-makers. For example, according to Adeyinka and Ubaru, the Nigerian National Telecommunications Policy makes provision for universal service obligations and universal access to enable all Nigerians to have access to all forms of modern information and communications technologies. An even more aggressive approach has been adopted by Uganda, which created a Rural Communications Development Fund to promote universal access which has been operational for over a year. The Rural Communications Development Fund is based on a one percent levy on telecommunications providers as well as World Bank funding. The goal of the policy is to ensure nationwide penetration and equitable distribution of communications services. Similarly the Mozambican government has established a Universal Service Fund to expand basic telecommunications access to a wider number of citizens in rural areas. The fund is to be financed by contributions from fixed and mobile telephone operators as well as ISPs.

The language of equity emerging in the universal service components of African ICT policies closely tracks that of the "digital divide" debate that arose in the late 1990s. These similar policies are a reflection of a north-south dialogue, reshaped to fit an African context. The fact that many African nations are focusing on tele-centers as well as the use of payphones to ensure access to telecommunications is a sign of "Africanization" as ICT access at communal points is far more crucial in developing countries where basic facilities such as fixed line telephones may be absent in rural areas.

The Cellular Telephony Revolution

The most important development in Africa's ICT landscape over the past decade has been the cellular telephony explosion. The use of mobile telephony has increased dramatically in developing countries—almost tripling in the last five years. The increasing number of cellular phones has also been accompanied by exponential increases in penetration rates.[8] In the year 2000, approximately 11 million Africans used mobile phones, and 3 million accessed the Internet. By the beginning of 2009, there were 246 million phone subscribers, and 32 million Internet users in Africa, a growth rate almost double that of the global rate.[9]

Total tele-density measures the sum of fixed and mobile telephones per 100 hundred inhabitants. In 1986, Kenya, Tanzania, and Mozambique all started[10] at levels below .8 percent. Mozambique and Tanzania had a penetration rate slightly above .2 in 1986, whereas Kenya's penetration rate that year was near .7 percent. The growth in tele-density all of these countries after 1999 was almost entirely from mobile phones. By 2000, Mozambique and tele-density had increased to.7, Tanzania's tele-density was at 1 percent, and Kenya's tele-density was near 1.5 percent. (Hesselmark, 2003). By 2008, Mozambique had reached 20 percent penetration of mobile cellular telephony, Tanzania had attained a penetration rate of 25 percent, and Kenya and Nigeria stood at the top, with a mobile cellular telephony penetration rate of 42 percent (Morshid, 2009).

The communications revolution was sparked by the spread of mobile phones, which are widely available to nearly 60 percent of the population, representing an eightfold increase in Internet users from the year 2008 over the year 2000 (Morshid, 2009). Despite these dramatic growth rates, penetration rates remain low, and indeed lower than those of other developing regions. The Internet is accessed by only 15 percent of the African continent (Southwood, 2008). Nigeria represents the highest growth level in cellular telephony, however, Kenya, Ghana, Tanzania and Cote D'Ivoire have also greatly contributed to the change in mobile cellular diffusion (Morshid, 2009).

Overall, Africans pay a much higher percentage of their income on cellular telephony and ICTs than nationals of other regions. The International Telecommunications Union has developed a method of comparing mobile tariffs in Africa by creating a "mobile basket" and an ICT price basket. In 2008, Africans paid an average of 23 percent of their monthly Gross National Income per capita ranging from a low of 1 percent in Mauritius, and a high of 60 percent in Togo.[11]

In addition, the International Telecommunications Union has created an ICT Development Index (IDI), which helps to analyze countries in terms of their "digital divide" status. It creates four groups of countries, with high, upper, medium and low IDI levels (Morshid, 2009). Interestingly, high ICT price basket levels are associated with low IDI values, and low ICT price levels are associated with high IDI levels. Accordingly, the US, Denmark, Norway and the UK, for example, have low ICT service prices and high IDI levels. By contrast, countries with the lowest IDI levels cannot afford some items in the ICT basket: a high-speed Internet connection represents 500 percent of average GNI per capita in Africa (Morshid, 2010).

Case Studies

The highest net additions of Internet users in Africa between 2000-2008 were in Nigeria, Kenya, Uganda and South Africa (Morshid, 2009). Distribution of mobile cellular subscriptions in Africa in 2008 was largely between Nigeria, South Africa, Kenya, Ghana and Tanzania, in that order. To examine the variation in the African ICT landscape, this paper looks closely at Nigeria, Kenya, Tanzania, and Mozambique as cases, which gives a sense of ICT policy and developments in Western, Eastern and Southern Africa. The paper touches briefly on Egypt, Rwanda and the Congo in order to consider changes in ICT in Central and Northern Africa.

Tanzania

Dramatic improvements in telecommunications access were being seen by the time of passage of the Tanzanian ICT Policy in early 2003. By 2003, there were about 1.5 million telephone subscribers in Tanzania. Tanzania had licensed 9 companies to provide public data communications including Internet bandwidth, and had licensed 16 ISPs.[12] By 2006, this number had doubled, and Tanzania had close to 6.5 million subscribers for mobile and fixed telephony. Despite this highly competitive market, the number of Internet users in Tanzania remains low. It represented less than 1 percent of the population in 2006, and Internet penetration was at 1.3 percent in 2008, lower than the African average.[13] Despite these low penetration rates, growth in the sector has been exponential. Internet users in Tanzania increased from 60,000 in 2000 to 333,000 by 2005, an increase of 455%.[14] At least a portion of this dramatic change over the past decade must be attributed to policy: Tanzania was an early passer of an ICT policy, and has adopted an aggressive liberalized ICT regulatory scheme which keeps costs of entry to operators fairly low.

By 2006, Tanzania was in heated competition with Uganda to become the most competitive information and communication technology market in East Africa and was voted one of “Africa’s Top Ten ICT Nations.”[15] Due to its sophisticated licensing approach, the country has a very competitive market profile in terms of telephone users, Internet users, and number of operators in the ICT sector. The most competitive telecommunications market in East Africa is found in Tanzania, which has five operators: Vodacom/Vodafone; Celtel; the state- owned, fixed-line provider Tanzania Telecommunications Corporation Limited (TTCL); Zantel, a joint venture between the government of Zanzibar and the Emirates Telecommunications Corporation; and finally, the Luxembourg-owned Tigo, which operates in Central America, South America, Africa and Asia.

Kenya

In Kenya, the ICT sector is one of the key movers of economic growth. Underpinned by growth in the ICT sector, in 2007, the ICT sub-sector grew 31.6 percent.[16] Mobile telephony dominated the market increasing the subscriber base to an astonishing 12.9 million in June 2008, up from 9.3 million in June 2007. Kenya added 3.3. million new Internet users between 2000 and 2008, the second highest contribution for the continent in that time period. Kenya’s Internet penetration rate in 2008 reached 8.7 percent, nearly double that of the African average Internet penetration rate of 4.2 percent, and nearly a percentage point higher

By 2007, ICT was creating more than 20,000 new jobs in Kenya. One of the major policy stumbling blocks for the ICT sector in Kenya has been a lack of true liberalization of the telecommunications sector. Thanks to the efforts of the Communications Commission of Kenya the sector has grown steadily more competitive. In a country of over 30 million, less than half of the population participates as telephony subscribers, which means that a vast mobile telephony market lies waiting to be tapped.

Until the recent privatization of Telkom, and the entry of Econet into Kenya's telecommunications market, there were only two major cellular telephony providers in Kenya: Safaricom and Celtel/Zain.[d] Although this duopoly was more competitive than the previous state owned monopoly, Kenya's cellular telephony market has not been truly competitive. In fact, Safaricom, which allegedly has large stakes from some of the biggest politicians in Kenya, controls 80 percent of Kenya’s telephony market.[17] Accordingly, Kenyan consumers have continued to pay sharply higher tariffs than necessary for mobile telephony. The lack of competitiveness in Kenya’s mobile telephony sector is reflected in comparatively high prices. On average, Kenyans pay more than most Africans for cellular telephony, giving up nearly 24 percent of their monthly GNI for mobile services per capita.[18]

[d]Safaricom is 60% owned by the Government of Kenya fixed line operator Telkom and 40% owned by the British Vodafone group.

In December 2007, the national fixed line operator Telkom, which had been hemorrhaging money up to that point, entered into a partnership with France Telecom enabling Telkom to enter into the mobile telephony market as well as the fixed line market.[e] The privatization of Telkom into Orange Telkom and the much delayed and litigated arrival of Econet into the Kenyan telecommunications market will allow four major players in the telephony market, bringing the Kenyan telecommunications sector even with its neighbors in Uganda. The new entrants have already forced dramatically reduced communication costs for consumers, who can now make calls for as little as 7 Kenya shillings, down from as much as 30 shillings per minute under the duopoly.[19] In addition, Kenya now boasts 51 service providers, 8 Internet backbone gateway operators, 6 VSAT operators, and 19 local loop providers. Yet, the number of Internet users in Kenya remains relatively low,[20] as most services are concentrated in urban areas, although most Kenyan citizens in this heavily agricultural country reside in rural areas.

Kenya has an ICT policy (2006), which is on the books, but has barely been implemented (MOIC, 2006). The country relies on a profusion of organizations with unclear and often overlapping mandates: including the Directorate of E-government, the Ministry of Information, the National Communications Secretariat, the ICT Board, and the Communications Commission of Kenya. Power tends to lie in the hands of persons, not institutions. The Permanent Secretary of Information, Bitange Ndemo, has been an important lever of reform, but after he leaves office, it is unclear who will step into his shoes. The Communications Commission of Kenya is a well-run technocratic agency, but is not truly independent, as shown when the former Minister of Information, Tuju, arbitrarily dismissed the board for making a licensing decision he disagreed with (Muriuki, 2005). As a result of this confused policy environment, the mobile telephony is not as competitive as in neighboring states, there is no universal service access fund, and little effort has been put into ensuring access to ICTs in rural areas.

Nigeria

Like many sub-Saharan countries, Nigeria has struggled with its telephone and communications infrastructure. As is the case in many other countries, large parts of the country have gone without land-line facilities. In 2000, over 10 million people were waiting to be connected to landlines by the state run telecoms monopoly NITEL. The difficulty of distributing telecommunications infrastructure throughout this nation is aggravated by both the massive physical size of Nigeria (910,768 sq km), as well as the population of that country —the largest in Africa— which will soon exceed 200 million persons.[21]

According to the ITU, Nigeria's Internet Development Index has increased more than 20 percent from the last measurement.[22] The number of Internet users has jumped from 7 per 100 inhabitants to about 16 over the past measurement year. This level remains

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[e]France Telecom acquired a 51 percent stake in Telkom Kenya.

substantially lower than penetration levels in developed nations, but much higher than the African average of 4 percent (Morshid, 2010).

Mobile phone services have transformed Nigeria's society and economy (Agoi, 2008). Nigeria has a massive mobile telephony market; indeed it is most prized of all African telephony markets, and the 8th largest telecom market in the world (Okonji, 2010). The Nigerian market has surpassed economic powerhouse South Africa due its potentially lucrative customer base (Agoi, 2008). As of March 2008, Nigeria has 60.9 million phone subscribers according to the Nigerian Communications Commission (Agoi, 2008). According to the Nigerian Communications Commission, two companies have national carrier licenses, four companies hold digital mobile licenses, and three companies perate international gateways.

The telephony market in Nigeria is dramatic and fast-moving, with soap-operatic episodes that include MTN's offices being surrounded and shut down by police. The drawbacks of operating in Nigeria are significant, and multiple challenges to the stability of the market exist. These challenges include a lack of a reliable power supply, the threat of fraud, the absence of a truly independent regulator, and an unstable policy environment (Okonji, 2010).

As of 2009, there were at least five active mobile providers in the country, including Etisalat, Globacom, Zain, MTN, and Visaphone, including three recently licensed operators which use GSM technology.[f] This large number of mobile providers makes Nigeria one of the most competitive cellular telephony markets on the continent. Other providers include the state incumbent, Nigerian Telecommunications Limited (NITEL). Nigeria is one of the fastest moving ICT sectors in Africa. Attempts to privatize NITEL have stalled. A consortium led by the China Unicom telecoms firm has placed a $2.5 billion bid to buy NITEL. However, the purchase has not yet been approved by the National Council on Privatization (Trust, 2010).

The competitiveness of the market and the battle among operators for market share is likely to work in consumers' favor in the long run. Nigeria's mobile telecommunication penetration rate has risen from less than one percent in 2001 to 32.79 percent in 2008 (Agoi, 2008). Overall tele-density rose from .4 in 2000 to 53 percent by the end of 2009 (Okonji, 2010). Nigerians paid considerably less than the continental average for mobile services, paying only 15 percent of their monthly GNI per capita, compared to a continent-wide average of 23 percent of GNI.[23]

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[f] GSM stands for Global System of Mobile Communications. GSM is a major phone communication system, and currently is the most widely used worldwide. The most visible aspect of GSM are SIM cards which ties the subscriber to the digital phone network, not the phone itself. Cell phones search for cell phone towers in the service area. GSM is a second generation cell phone system. Three Nigerian GSM operators were licensed recently, the South African based MTN Nigeria, the Kuwaiti based Zain, and M-TEL, the mobile arm of NITEL.

Nigeria also has made significant strides in terms of Internet access. Nigeria has added 10.9 Internet users between 2000 and 2008 representing 38 percent of the total Internet user additions in Africa (Morshid, 2009). In terms of infrastructure, Nigeria is making heavy use of Very Small Aperture Terminals (VSATs) for both Internet and Telephony access. Lagos and Abuja are the two largest urban markets in Nigeria. The challenge for this massive and highly populated country is getting cellular telephony and Internet out to the vast rural areas. New technologies may enable better access, as convergence blends telephony with Internet. Due to its highly lucrative market, and the fact that the market is not even halfway saturated, Nigeria is likely to be the location of many technological innovations to distribute innovative technologies. Wireless broadband services such as WiFi and WiMAX, and alternatives to GSM technology such as Code-Division Multiple Access (CDMA) offer new chances for licensing.

Nigeria has a Federal Ministry of Information. However, as is the case in several African countries, much of the core ICT work in the country is done by the regulator and the implementer which are not directly answerable to the Ministry. The Nigerian Federal Executive Council approved a national IT policy in March 2001.[24] Implementation started in April with the establishment of the National Information Technology Development Agency. The policy recognized the private sector as the driving engine of the IT sector. The other main regulatory body is the Nigerian Communications Commission, the (allegedly) independent National Regulatory Authority for the telecommunications industry in Nigeria. The Commission is responsible for creating an enabling environment for competition among operators in the industry as well as ensuring the provision of efficient telecommunications services throughout the country.[25] Nigeria's regulatory structure is diffuse and confusing, with unclear lines of authority, and a weak regulator that is not truly independent of the central government.

Mozambique

Mozambique was ranked as the poorest country in the world in 1992. Yet, the country has experienced an impressive economic recovery which has dramatically reduced the number of people living in poverty. In addition, the country has seen consistently high economic growth levels. Nonetheless, Mozambique remains one of the world's poorest countries.[26] According to the World Economic Forum, Mozambique ranks 116st out of 133 ranked economies with regard to its ability to benefit from ICT developments.[27] This low ranking, however, masks some of the exciting policy changes occurring in this nation.

Mozambique has an aggressive and well defined policy environment, including a communications strategy, a telecommunications law (revised 2004), an ICT policy (2000), and an ICT implementation framework (2002). In addition, in 2007, Mozambique's government was one of the few on the continent to create a Universal

Access Service Fund Regulation to deliver telecommunications services to rural areas and low income zones (Giroth, 2008).

As in other African countries, the idea of an information policy resurfaced in Mozambique in the mid-1990s at a regional symposium organized by UNECA, ITU, UNESCO and IDRC in Addis Abbaba. This meeting was attended by several influential Mozambicans, who also attended the information society and development symposium in 1996. A high level Commission headed by the prime minister and a multi-stakeholder team was established in 1998.[28] The ICT Policy was formally submitted to the Council of Ministers and approved by them in December 2000. In addition to completing an ICT Policy, Mozambique's Council of Ministers approved its information and communication technology policy implementation strategy in 2002. The Mozambican ICT Policy focused on using ICT for poverty reduction activities.

In the first decade of the new millennium, Mozambican urban areas have been reshaped by the cell phone, the Internet and other forms of digital equipment.[29] Mobile services were launched in the country in November, 1997. At the beginning of the decade, MCell was the sole provider of mobile telephony in Mozambique, and users numbered less than 15,000.[30] As of 2009, the country had over 5 million mobile telephony subscribers, and MCell was the dominant player, but faced real competition from Vodacom, which was licensed in 2002 and now commands over thirty percent market share (Giroth, 2008). Mozambique is benefiting from reduced telephony prices as the Mozambican subsidiary of the South African mobile phone company Vodacom slashed tariffs in that country for customers on contracts ten percent.[31] Clearly, tariff reductions are crucial, as noted by the Mozambican National Communications Institute, because they allow more Mozambicans to access to mobile phone services. Growth in data services in Mozambique has also been strong.[g]

The Major ICT issues Mozambique currently faces include a limited expansion of the telecommunication network backbone and the low level of literacy of the Mozambican population. Neither the fixed line sector nor the mobile cellular sector are adequately competitive, and costs are comparatively high. Citizens in Mozambique pay 40 percent of their monthly GNI per capita for mobile services, making it one of the most expensive mobile regions in Africa.[32] In addition, competition in the mobile telephony sector is low, with only two cellular providers. The country has less than half a million Internet subscribers.[33]

Egypt, Rwanda and the Congo: The Good, the Bad and the Ugly

Egypt

[g] (Mundy, 2010)

Egypt is more developed than any of the other countries discussed in this article. Its ICT Development Index is grouped with Arab States, where it ranks 12 out of 19 states in the region (ITU, 2009a). The ITU has developed four groups of economies: high, upper, medium and low. Egypt falls in the medium group for the ICT development index. Using Sweden 2008 as the benchmark, Egypt lags somewhat in terms of digital divide terms but is still far ahead of nearly every other African nation. In terms of prices, the ICT price basket for Egypt is quite low compared to other African nations, representing about 3.4 of monthly GNI per capita (Morshid, 2010). Egypt's mobile penetration rate is 72 percent, orders of magnitude higher than the 4 percent African average. The Internet penetration rate is nearly 22 percent.[34]

These high ICT penetration numbers indicate a qualitative difference between more developed areas of Egypt and other locations in Sub-Saharan Africa. Egypt could be an excellent guidepost for Sub-Saharan Africa in terms of policy coordination. Egypt passed a Telecommunications Law in 1998, and in line with most countries on the continent, unbundled operations and regulation, resulting in the creation of the National Telecommunications Regulatory Authority and Telecom Egypt as an operator. NTRA, which was strengthened in 2003, is supposed to function as the independent regulatory authority for the sector. The Ministry of Communications and Information Technology was founded in 1999 to "lead Egypt's transition into an Information Society." MCIT has facilitated partnerships with public, private, non-profit civil society and multi-lateral stakeholders to invest in ICT initiatives.

Egypt's Ministry of Communications and Information Technology has formulated a Telecommunications Master Plan in conjunction with the private sector (MCIT, 2010). Egypt does not yet have a Universal Service Fund, unlike some of less developed countries, such as Mozambique and Rwanda, yet plans to implement one. Egypt plans to establish a high speed Internet backbone, and continue to liberalize services. Like other African countries, Egypt still faces challenges, such as a mobile cellular telephony sector that needs further liberalization. A third mobile license was granted in 2006 to Etilsat, but that still leaves the Egyptian cellular market much less competitive than that of less developed countries like Tanzania and Uganda.

Rwanda

Rwanda scores very high compared to all African nations with regard to implementation and distribution of ICTs by the government. The country has a sophisticated ICT policy environment, with well thought out goals and timetables, and a high level of accountability for ensuring public access and promoting universal service. Rwanda has made impressive strides in funding and building telecenters, public post offices, and putting computers in schools.[35] Rwanda also has one of the few functioning universal service access funds in Sub-Saharan Africa.

Yet, Rwanda is one of the least competitive nations in the ICT arena, and has only two telecommunications companies: Rwandatel and MTN. Rwanda's own state telecommunications monopoly may not help it to attain its technological dreams. More competitive sectors drive prices down, provide infrastructure redundancy, increase the amount of tax revenue available for large projects, and create wellsprings of technological expertise. Rwanda has less Internet users than the African average: approximately 3 per 100 inhabitants against an African average of 4.2.[36] In 2008, Rwanda's mobile cellular penetration also fell below the continent average, at 13 percent. Finally, mobile prices in Rwanda were some of the highest on the continent, at 38 percent of monthly GNI per capita (Morshid, 2009).

Whereas Rwanda's neighbors all have vibrant private sector participation in the realm of ICT, Rwanda's telecommunications and ICT industry remain monopoly operations for the most part (Nixon, 2007).[h] Rwanda's Rural Communications Development Fund is its universal service access fund. This universal service fund is one of the first of its kind on the continent, and an innovative policy instrument which should be applauded. Yet it depends heavily on revenues from telecommunications operators, of which Rwanda has only two, one of which is state owned. Thus, opening up the private sector, and encouraging competition would enable Rwanda to increase its revenues for rural development, and sustain the country's efforts to bring ICT to the countryside as donor money dwindles in a tightening global fiscal environment.

Congo

The Democratic Republic of Congo is Africa's largest country. It is also one of the Least Developed Countries in the world. In terms of the ICT development index, the country is ranked 29, just ahead of Eritrea. Among all countries, its IDI index of 1.16 ranks the D.R. Congo at 150 in the world out of 159 countries studied. (Morshid, 2010).[i] Congo's percentage of Internet users is exactly at the African average of 4 percent (Morshid, 2009). Surprisingly, Congo has very high mobile cellular telephony penetration, at 47 percent, its penetration rate is above that of Kenya and Nigeria. Data on the cost of a mobile telephony basket in the DR Congo is unavailable even through the ITU or the World Bank. However, the country has some of the highest mobile termination rates in the continent. These high rates are essentially a side effect of a lack of regulation in the sector.

[h] The current main operators in Rwanda include ARTEL, which is dedicated to rural communication and Rwandatel (currently operated by a Libyan concern) which is the country's sole provider of fixed telephony, voice, data and Internet. ARTEL's license is focused on rural areas and has a mandate to install 400 very small aperture satellites to improve connectivity in rural areas. ARTEL has largely met this commitment and by 2006, Artel had installed about 320 VSATS. Rwandatel, formerly Terracom, has been less successful at meeting its universal service obligations.

[i] By comparison, Sweden is ranked first in IDI with an index of 7.65, Russia is ranked 48 with an IDI of 4.54, and Egypt is ranked 96 with an index of 2.70.

There is no national policy for ICT in the DR Congo, and government officials do not prioritize the issue of ICT development. The country does not have a defined national ICT policy. According to the World Bank, local suppliers do not benefit from the national backbone, and the government is not making progress on expanding the backbone. The Internet relies solely on satellite, and is thus expensive and unstable. Congo has suffered from political instability and ongoing. As a result of a near complete policy vacuum, ICT remains largely undeveloped in the Congo as a sector (Fall, 2007).

The Role of Civil Society and Non-Governmental Organizations

What exactly is the transmission mechanism of content from the developed West to developing Africa in terms of ICT policy content? Transnational organizations, international organizations and donors have acted as purveyors of values and norms which have encouraged African nations to place ICT on the policy agenda. The state is a powerful political actor but there are also important extra-state actors, such as NGOs and the private sector, which can have an impact on the nature and processes of decision-making by the state and by government actors. Further, decision-making procedures that provide access to nongovernmental and transnational actors can lead to change. As sources of new information and strategic actors in their own right, such groups are often able to use new points of access to gain unexpected leverage over policy.

Thus, nongovernmental organizations and donors have contributed to the flow of ideas about telecommunications reform in Africa. Yet, local agency is a key factor in the development of ICT policies. Local actors who have interests in ICT policy include community based organizations, local politicians, policy entrepreneurs within the state structure, trade associations and domestic private sector entities. For example, businesses look to ICT policies to exemplify stable regulatory environments. Bureaucrats may be better able to provide services and strengthen regulatory capacity, and activists can move forward on social goals. These payoffs motivate local actors to dedicate significant resources to this emerging policy issue.

Conclusion

Poor and remote areas in Africa are less likely to have ICT because they begin with sparse infrastructure and are perceived as unprofitable. Indeed, many of these areas lack basic access to electricity and copper wire fixed line telephone infrastructure. Only an aggressive mix of government investment, subsidy, regulation, and obligations on the private sector can make universal access to even basic telecommunications in African rural areas a reality.

The economic impacts of ICT are not yet fully understood. However, high bandwidth can create new industries such as business process outsourcing and call centres (Southwood, 2008). In Nigeria, the mobile telephony sector has attracted US$15 billion of direct foreign investment (Agoi, 2008). The sector has created millions of jobs in Africa, many in the informal sector, including hawking recharge or "airtime cards" and selling handsets, or repairing cellular phones.

This may change with the advent of convergence, and the availability of Internet over wireless devices. However, the devices such as iPhones and blackberries that allow such accessibility have high bandwidth demands, and are expensive enough to be out of the reach of the average citizen. The next challenge for Africa's private sector is to create affordable mobile access to Internet. This challenge will depend on countries and markets developing affordable handsets, a stable power supply, a competitive market and a reasonable regulatory structure.

Access on the East Coast of Africa has been increased dramatically by the advent of EASSy, a cable which provides higher bandwidth access to East Africa, which was the last area of Africa being served solely by satellite. EASSy was financed in part by support from the World Bank (Telkom, 2010). According to the Association for Progressive Communications, the private sector is likely only to deliver backbone capacity to a small percentage of any national population. Building infrastructure is an expensive capital project, which gives private sector providers little incentive to invest (Southwood, 2008). Creating national fiber infrastructure companies may be one solution to building a national backbone. Using the incumbent, some of the countries using this approach include Ghana, Rwanda, South Africa and Uganda.

The common denominator among African nations with a well-thought out universal access policy seems to be youthful, charismatic leadership at the top, a state-led populist leadership strategy, and a focused interest in ICT as a tool for development.[j] Due to careful planning, a centralized developmental state, and an enthusiastic effort at reconstructing a country destroyed by civil war, President Paul Kagame of Rwanda Kagame is producing impressive results in terms of developing information and communication technologies in his country. Other positive factors include a high level of NGO presence and significant domestic civil society input in economic transformation. Activist leaders working with donors, the civil society and the private sector have made an important contribution to ICT policy by promoting a planned process. Some African nations have made significant commitments to the social equity aspects of ICT. Countries like Rwanda, Mozambique and Uganda have placed ICT within larger development strategies which emphasize the importance of areas such as education, resource development, health, infrastructure, universal access and governance.[37]

[j] Stated more critically, Kagame operates in a top-down, centralized hierarchical way.

By situating ICT in the context of other development goals, a national policy makes it likely that regimes will actually achieve universal access goals. Further, precise targets -- such as Uganda's goal of establishing one Internet point of presence in every district of Uganda by the end of 2004 -- promote accountability and a yardstick to measure progress. Finally, aggressive policy instruments such as universal service funds established in Rwanda and Mozambique build on and expand the gains made in the 1990s. By contrast, Kenya, which has a vibrant private sector led economy but lacks activist leadership, has only recently made progress on developing an ICT policy and has weak plans regarding universal access. Any progress to date must be attributed to the indigenous private sector and civil society, which must push African governments where political leadership remains stagnant.

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