Hitting or Missing African UAS Objectives?

An Evaluation of Universal Access and Service (UAS) Policy Guidelines for Developing Countries

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Abstract: Most African countries have historically lagged in telecommunications development. Recent modifications to universal access and service (UAS) policies have helped develop an environment capable of unprecedented mobile telecommunications growth. The World Bank Information for Development Program (InfoDev) and the International Telecommunication Union (ITU) developed "The ICT Regulation Toolkit" (ICTRT) to serve as a "best practice" guide for ICT policymakers in developing countries. The ICTRT recommends that developing countries include roll-out obligations in telecommunications licenses, develop a UAS fund to manage subsidies needed for investment, develop commercial rather than UAS policy solutions, take advantage of new technological efficiencies to achieve UAS objectives, include social factors in the design of UAS policies, and align UAS objectives with national social programs to foster co-achievement of long-term development goals. By conducting a critical analysis of Uganda's adoption of the ICTRT "best practice" guidelines, this paper contextualizes the impacts of policy transfer. The paper concludes with supply and demand-side UAS objectives that should be incorporated into the ICTRT.

Key words: InfoDev/ITU ICT Regulation Toolkit, Mobile broadband, Mobile telecommunications, Universal access and service, Uganda, sub-Saharan Africa.

<p style="float:left; font-size:600%; line-height:0.8; margin:0 8px 0 0;">A</p>ccess to information and communication technologies (ICTs) is increasingly considered a vital contributor to economic and social development in developing countries (HUDSON, 2006; DONNER, 2006; ROLLER & WAVERMAN, 2001). Telecommunications access is perceived to promote economic development by enabling the acquisition and exchange of information (see SAUNDERS, WARFORD, & WELLENIUS, 1994; KABA, DIALLO, PLAISENT, BERNARD & N'DA, 2006). Thus, universal access and service (UAS) policies have been designed to promote development of telecommunications infrastructure and services, particularly in rural or underserved areas.

Africa has traditionally lagged behind in telecommunications development. However, increased investment and adoption of mobile

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telecommunications has allowed African countries to "leapfrog" fixed-line telecommunications (SINGH, 1999; HUDSON, 2003). From 2005 to 2010, mobile telephone subscriptions increased from 12 to 41 percent (%) across Africa, whereas access to fixed telephone lines remained fairly steady at 1.5% (ITU, 2010a).

Mobile telecommunications development has been highly varied across African countries (Ernst & Young Telecommunications Industry, 2009). African countries can be categorized into three mobile telecommunications market saturation categories: developed, emerging, and virgin (*ibid*.). In the developed category, mobile penetration is above 50% with countries such as South Africa with 98% mobile penetration. Countries in the virgin category have mobile penetration rates below 20% of the population. These countries are typically politically unstable and have highly regulated, government-controlled telecommunications sectors (e.g., The Democratic Republic of Congo and Zimbabwe) (*ibid*.).

Nearly half of African countries are located in the emerging market category with mobile penetration rates between 20 and 49% (Ernst & Young, 2009). Kenya and Uganda are considered emerging markets. Growth of mobile telecommunications in emerging countries has been attributed to regulatory changes in alignment with global "best practices" guidelines (*ibid*.). The World Bank Information for Development Program (InfoDev) and the International Telecommunication Union (ITU) created the "The ICT Regulation Toolkit" (ICTRT) to provide "best practices" recommendations to global ICT policymakers, particularly those in developing countries. In addition to recommendations for structural changes in the sector (e.g., liberalization, introduction of competition, establishment of an independent regulatory agency), the ICTRT provides general UAS policy recommendations (InfoDev/ITU, 2011a).

Uganda was among the first countries in sub-Saharan Africa to establish UAS policies (AKPAN-OBONG *et al*., 2009; Intelecon, 2005). Thus, Uganda was used as a case study in this paper. The purpose of this paper is to understand the applicability of the ICTRT UAS recommendations and to identify "best practices" for developing countries. In order to complete these tasks, this paper (1) critically evaluates Uganda's UAS initiatives and how closely these initiatives align with ICTRT guidelines and (2) uses Uganda as a contextualization to evaluate how ICTRT UAS guidelines may be modified to better fit developing countries' needs.

■ Theoretical framework: Public policy transfer

The concept of "lesson drawing" is often used to describe the transfer of policies from one nation to another, one sector to another, and so on (ROSE, 1993). Policies are not always transferred verbatim from developed to developing countries, what ROSE (1993) calls "copying", but are also adjusted, synthesized with other polices, or used to form nascent policies (p. 30). DOLOWITZ & MARSH (2000) emphasized the difference between transfer of policies under "coercive" and "non-coercive" means. As globalization further interconnects all nation-states, global pressures to conform to global economic standards will likely increase (SINGH, 1999). Countries that receive funding from international institutions (e.g., World Bank, International Monetary Fund, International Telecommunication Union, etc.) often must ascribe to policy recommendations as a condition of loan agreements, which would be considered "coercive" adoption. DOLOWITZ & MARSH (2000) hesitate to consider policy adjustments tied to funding as "coercive", as developing countries are likely to utilize consultants who are able to analyze and guide appropriate policy adoption and modification to fit local realities. However, authors cautioned that pressures from the funding agency might influence adoption of policies verbatim or with little modification (*ibid.*).

Globally, liberalization and privatization of the telecommunications sector has become commonplace (SINGH, 1999; LEVY & SPILLER, 1996). Developing countries have begun to implement neo-classical structural adjustments in alignment with global standards. For example, it was not until the mid-1980s when it was common for developed countries to liberalize their telecommunications sector that developing countries began implementing the same structural adjustments (see SINGH, 1999). Currently, there has been a trend toward further deregulation and utilization of market mechanisms to develop telecommunications infrastructure in hard-to-reach or unprofitable areas. Drawing from policy transfer theory, this research hoped to answer the following research questions:

- What does the ICTRT put forward as the main "best practices" for universal access and service policies in developing countries?

- How has Uganda implemented UAS policies and how do these policies reflect guidelines from the ICTRT?

■ Methodology

The author employed two research methods. First, the ICTRT was read multiple times to identify the most prominent UAS "best practices" guidelines proposed for developing countries. Second, the author used Uganda as a case study to contextualize adoption of the ICTRT "best practice" guidelines. Uganda was used as a single case study due to its status as a sub-Saharan African exemplar in the adoption and funding of UAS initiatives (AKPAN-OBONG *et al*., 2009). A single case study is meant to elucidate the impacts of the influence of certain phenomena under particular conditions. Evaluation of Uganda as a single case allows for a nuanced understanding to emerge from extending, building upon, and challenging theoretical assumptions through evaluating contextualization of policy guidelines (YIN, 2012).

■ ICT Regulation Toolkit (ICTRT)
Universal Access and Service (UAS) Policy Guidelines

UAS guidelines tend to focus on increasing the "availability, accessibility and affordability of telephony and the Internet" as a means to promote social inclusion and economic development locally and within the global economy (InfoDev/ITU, 2011). The ICTRT (InfoDev/ITU, 2011) outlines four UAS infrastructural targets to increase accessibility of telecommunications to rural populations:

• Establish a public phone for all communities larger than 2000 inhabitants;

• Ensure a limited walking distance to a public phone (e.g., 5 km for communities too small to have their own public phone;

• Construct an Internet Point of Presence (POP) in district centers, provincial capitals or towns above 20,000 inhabitants that provides either high-speed or broadband capacity; and

• Establish a public access Internet center accompanying the Internet POP.

To achieve the aforementioned infrastructural goals, the ICTRT outlines many potential "best practices" developing countries should adopt. Five of the most prevalent UAS "best practices" found in the ICTRT include: (1) incorporating incentives and roll-out obligations into telecommunications

licenses with development of a UAS fund to manage disbursements; (2) emphasizing commercial rather than UAS policy solutions; (3) including new technologies and technological convergence in UAS policies, (4) including social factors in the design of UAS policies to not only encourage universal access [1] but universal service [2], and (5) aligning UAS objectives with national social programs to foster co-achievement of long-term development goals.

Incorporate incentives, roll-out obligations, and a UAS fund

The ICTRT encourages incorporating incentives to increase mobile coverage in unprofitable areas by granting exclusivity licenses with roll-out targets into mobile telecommunications licenses. This approach has been credited with expanding mobile coverage to nearly 96% in Morocco and 98% in South Africa (InfoDev/ITU, 2011). It is important to note that UAS commitments must provide incentives and opportunities through trade-offs. For example, the ICTRT recommends that if a licensee is obligated to service a rural area, it should receive either a reduction in its contribution to the UAS fund, a reduction in tax obligation, or on import duties on end-user equipment or infrastructure (InfoDev/ITU, 2011).

Emphasize commercial rather than policy solutions

The ICTRT encourages developing countries to evaluate whether regulatory intervention is needed or if market conditions are capable of developing infrastructure and services. Long-term goals should be to decrease regulation of the sector and to promote market mechanisms that fulfill needed UAS objectives. Advancements in technology and increased economies of scale may facilitate early investment by mobile telecommunications operators in areas previously considered unprofitable.

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[1] Universal access has historically pertained to "public, community or shared access to telecommunications" (InfoDev/ITU, 2011).

[2] Universal service has historically meant "the affordability of telephone services […] among households desiring that service" (InfoDev/ITU, 2011).

Include new technologies in UAS policies

The ICTRT outlines formation of "forward-looking" UAS policies that encourage regulatory changes such as reducing market entry requirements for new technologies and service by adopting technology neutral licensing and allowing spectrum trading and in-band migration. The blurring of distinctions between technology platforms and the efficiency gained from use of wireless technologies necessitates an evaluation of the potentially inefficient nature of technology specific policies. Particularly in developing countries where wireless technologies are more cost-efficient than landline telecommunications, the reach of fixed-line providers may be weaker than mobile telecommunications providers (KELLY & ROSSOTTO, 2012; InfoDev/ITU, 2011). As such, the ICTRT encourages adopting technology neutral licensing to facilitate equal contribution to UAS funds by all types of telecommunications services and technologies.

Include social factors in the design of UAS policies

The ICTRT emphasizes that UAS policies should attempt to be as socially inclusive as possible (i.e., policies should be formulated with the needs and social constraints of constituents in mind). Policies should be implemented that create not only access to ICTs but assist users to "overcome exclusion, improve economic performance, employment opportunities, quality of life, social participation and cohesion" (InfoDev/ITU, 2011). Particularly in developing countries, the ICTRT encourages UAS policies that take into account the needs of women, as women tend to have lower incomes and higher barriers to access ICTs (*ibid*.).

## Align UAS policies with national social programs and goals

UAS policies should integrate with and support other national social programs. The ICTRT encourages inclusion of new technologies in universal service obligations if "use [of] the service [has] become essential for uniform countrywide economic development or social inclusion" and if "normal commercial forces [are] unable to make the service available for all to use within a timescale consistent with the contribution of the service that will meet the Millennium Development Goals" (InfoDev/ITU, 2011). Access to broadband Internet is considered integral to the provision of e-education, e-banking, e-commerce, and e-government services (*ibid*.). These services

promote achievement of the United Nations Millennium Development Goals (MDGs) through, for example, distance education and telemedicine (KELLY & ROSSOTTO, 2012; InfoDev/ITU, 2011).

■ Telecommunications in Uganda

Uganda is a landlocked country that is approximately 236,00 km2 in East Africa (World Bank, 2011). Uganda has a population of approximately 33 million, of which 28 million live in rural areas (*ibid*.). Uganda's administrative division consists of the city council of Kampala (n=1) and district councils (n=55) serving as the highest tiers of government in charge of executive decisions. Rural districts are divided into sub-counties (n=920) and further into parishes (n=5,225) (UCC, 2005; STEFFENSEN, TIDEMAND & SSEWANKAMBO, 2004). Prior to 1997, 70% of Uganda's communications services (e.g., landline telecommunications and postal services) were concentrated in urban areas (UCC, 2001). While fixed-line telecommunications has stayed fairly steady at a penetration rate below 1%, mobile telecommunications coverage extends across nearly 75% of the country (ITU, 2010b) (see Figure 1). Mobile phone subscriptions increased from approximately 2 million to nearly 13 million over the past five years, indicating that approximately 40% of the population has a mobile telephone (World Bank, 2011) (see Figure1). This figure may be slightly off due to individuals who own more than one subscriber identity module (SIM) card.

Figure 1 - Number of mobile telephone subscriptions in Uganda from 1995-2010
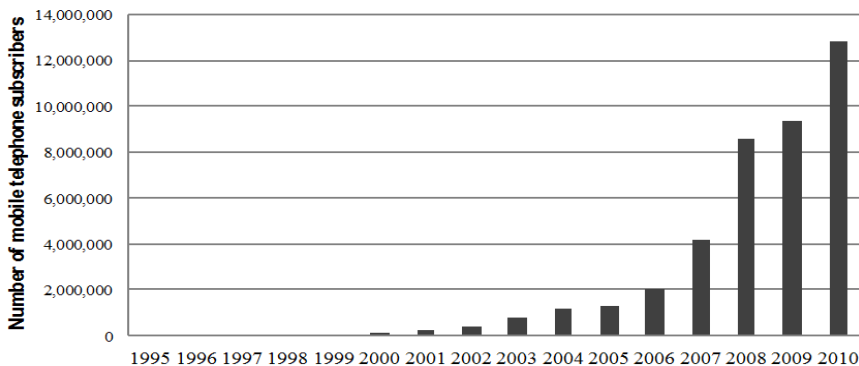
Source: World Bank, 2011

Rapid growth in adoption of mobile telecommunications can be attributed, in part, to Uganda's Communications Act of 1997, which established UAS initiatives, UAS funding mechanisms, privatized the incumbent telecommunications operator (Uganda Telecommunications Limited), and established the Uganda Communications Commission (UCC, 2001; AKPAN-OBONG *et al*., 2009). The UCC operates under the Ministry of Information and Communication Technology, but is perceived to have autonomous decision-making powers and is independently funded (ITU Eye, 2012).

Uganda serves as an exemplar in the growth of mobile telecommunications subscribers. Uganda ranks third in Africa (behind Democratic Republic of Congo, 36%, and Equatorial Guinea, 36%) with a 33% compound annual growth rate in mobile telecommunications subscriptions from 1993 to 2003 (KELLY, 2009). As of 2011, there were four fixed-line telecommunications providers including: Uganda Telecommunic-ations Limited (UTL), the incumbent; Mobile Telephone Networks Uganda (MTN Uganda), based out of South Africa; and Warid Telecom, a United Arab Emirates-based company. In addition, UTL, MTN Uganda, and Warid Telecom offer mobile telecommunications. Airtel, based out of Kuwait, and Orange Telecom, a France-based operator, also offer mobile telecommunic-ations (UCC, 2011). The final mobile telecommunications provider, Smile Communications, based out of South Africa, offers Voice over Internet Protocol (VoIP) [3] service through mobile phone handsets (First VoIP WiMax, 2009).

By 2009, there were ten broadband Internet service providers (ISPs) in Uganda (UCC, 2009a) [4]. While the number of providers increased, satellite remained the only international Internet access resulting in high cost of access unobtainable by the majority of the population (UCC, 2009b). The UCC has included broadband Internet development as a UAS objective and has invested over $270 million, the bulk of which has been invested in mobile broadband. UAS objectives currently outline utilizing mobile broadband technologies such as WiMax, LTE, and EV-DO. Three main mobile telecommunications providers, MTN Uganda, UTL, and Airtel, have

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[3] Voice over Internet Protocol (VoIP) refers to a range of protocols sent over packet switched networks. Voice is broken down into packets that can be sent to the final destination by any route available (CHETTY, BLAKE & McPHIE, 2006).

[4] Broadband Internet service providers in Uganda include Uganda Telecommunications Limited (UTL), Mobile Telephone Network Uganda (MTN UGANDA), Bukasa Telecom, Infocom Uganda Limited, Afsat Communications Uganda Limited, Kampala Siti Cable, Broadband Company (TMP), Tangerine, Orange Uganda Limited, and Warid Telecom Uganda (UCC, 2009a).

deployed mobile broadband Internet connectivity (SCHMID, 2009). The GSM base stations that provide mobile telecommunications to the majority of the country can be used as hubs for a nation-wide broadband wireless system. From 2009 to 2010, mobile broadband connections through GSM base stations increased subscriptions from 310,000 to 520,000 (UCC, 2011). However, only a fraction of the population, 9%, has access to any form of the Internet (*ibid*.). Uganda is making steady progress toward achievement of UAS infrastructural targets; however, there is still substantial need for further development (see table 1).

Table 1 - Universal access and service (UAS) infrastructural targets executed under the Uganda Rural Communications Development Policy (RCDP) as of January 2012

Uganda UAS Infrastructural Targets	Number Implemented as of January 2012	RCDP UAS Targets	Number still needed
Public Pay Phones (PPP) (Establishing a PPP for all communities larger than 2000 inhabitants and ensuring a limited walking distance)	4,099	10,000	5,901
Internet Points of Presence (POP) (Establishing an Internet POP in district centers, provincial capitals or towns above 20,000 inhabitants and providing either high speed or broadband capacity)	76	One POP per district = 112	36
Communication Information Center (CIC) (Establishing a public access CIC accompanying the Internet POP)	78	One CIC per county = 550	472
Internet Cafés (Establishing a public access Internet center accompanying the Internet POP)	106	One Internet Café per district = 112	6

Note: Parentheses contain InfoDev/ITU infrastructural target guidelines.

Source: UCC, 2012

■ Uganda's UAS objectives and alignment with ICTRT guidelines

Incorporation of incentives and roll-out obligations

The Rural Communications Development Fund (RCDF) was established in 2003 out of the 2001 RCDF Policy (UCC, 2009b). The RCDF provides a one-time "smart subsidy […] to encourage commercial suppliers to enter the

market but not to create unending dependency on subsidy" (*ibid*., p. 6). A World Bank contribution of over $5 million helped to initiate the RCDF with a stipulation that funds be spent on achieving the four UAS infrastructural targets (InfoDev/ITU, 2011; World Bank, 2001) (see table 1). Funds were to be used as subsidies for telecommunications operators to develop infrastructure in locations determined not to be commercially viable. Facilities-based telecommunications service providers including fixed-line telecommunications providers, mobile telecommunications providers, and operators of terrestrial telecommunications infrastructure contribute funds annually to the RCDF through a 1% levy on gross revenues (UCC, 2005).

The UCC has served as an exemplar in sub-Saharan Africa in the allocation of smart subsidies through reverse auctions. Reverse auctions take into account commercial forces (i.e., power of the market) to complete a development task. Companies submit a bid outlining their project plan and financial needs for completing the project. The winning bid may be the lowest or may be the bid that best completes the requested UAS objective (WALLSTEN, 2008). As of 2005, for every $3 invested by private telecommunications providers, the UCC compensated the provider $1 from the RCDF (GILLWALD, 2005).

"Serve or lose" clauses were included in the two largest mobile operators' licenses, Uganda Telecommunications Limited (UTL) and MTN Uganda. Under guidance from the World Trade Organization, the UCC granted an exclusivity period to UTL and MTN Uganda as "national telecommunications operators" and allowed a duopoly for a five-year period from 2000 to 2005 (DJIOFACK-ZEBAZE & KECK, 2009). The two operators would lose their exclusivity to rural areas if they did not achieve UAS infrastructural targets (see table1). Since the two operators had already reached a scale of production that made investment in rural areas less of a financial burden, both implemented UAS targets in the majority of their service areas without receipt of subsidies (UCC, 2005; NAVAS-SABATER & AMPAH, 2007). However, the two operators declared that they could not viably service (even with the aid of a subsidy) 154 of the country's 920 sub-counties and forfeited their exclusivity licenses to these areas (UCC, 2005). As a result, telecom operators willing to invest in these areas could enter the market and compete for a subsidy.

Emphasizing commercial solutions instead of policy solutions

While smart subsidies are a policy solution, they are designed to aid future commercial viability of operations in an area by decreasing the financial burden of initial sunk costs through a one-time subsidy. Use of the smart subsidy has helped operators expand services to areas previously perceived as commercially unviable. At first, the two largest telecommunications operators, UTL and MTN Uganda, were able to use their economies of scale to invest in rural telecommunications development; however, extremely rural areas were deemed too risky. While commercial solutions initially expanded telecommunications services in areas in close proximity to already served areas, the RCDF was needed to encourage further investment in underserved areas. Figure 2 below shows the areas of Uganda served by UTL and MTN Uganda during their five-year duopoly. Figures 3 and 4 show the extensive mobile telecommunications coverage by UTL, MTN Uganda, Airtel, Orange Telecom, and Warid in 2012.
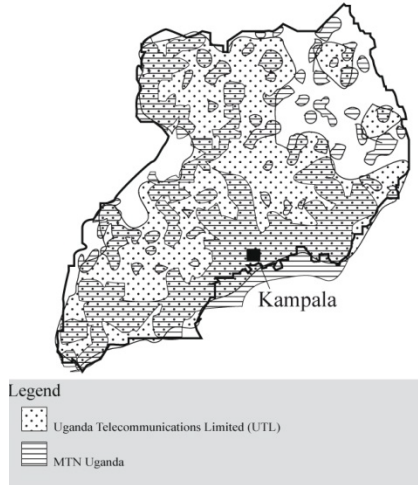
Figure 2 – Mobile telecommunications coverage of Uganda Telecommunications Limited (UTL) and MTN Uganda during duopoly in 2001
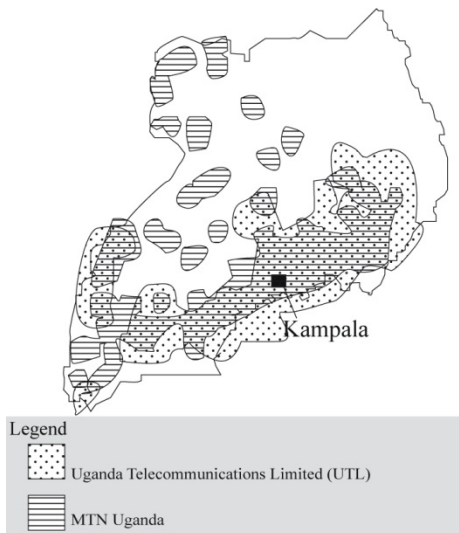
Note: Service areas are not 100% accurate.
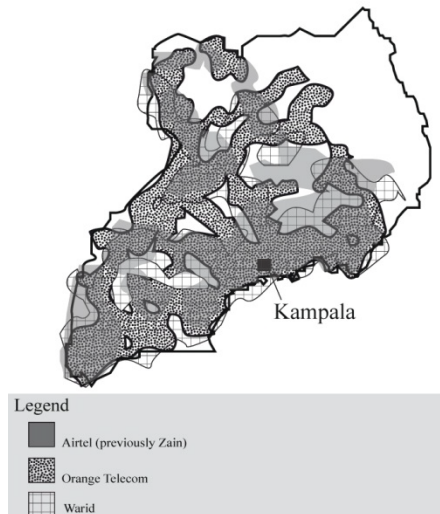
Source: Econ One, 2002

Figure 3 – Mobile telecommunications coverage of Uganda Telecommunications Limited (UTL) and MTN Uganda in 2012

Note: Service areas are not 100% accurate.

Sources: UTL, 2012; MTN Uganda, 2012

Figure 4 – Mobile telecommunications coverage of Airtel, Orange Telecom, and Warid in 2012

Note: Service areas are not 100% accurate.

Source: GSMA, 2012

Include new technologies in UAS policies

Technology neutral licensing was implemented in 2007 in order to provide equal opportunity to fixed-line telecommunications providers and mobile telecommunications providers to bid for government-subsidized UAS projects (UCC, 2007). Technology neutral licensing allows for operators to choose the most cost-effective technology in order to lower estimated cost of providing the service and to increase bidding competitiveness in reverse auctions. Uganda has explicitly modified its telecommunications regulations in line with the ICTRT recommendations to allocate spectrum in regard to technological convergence and to promote technological advancement. Uganda has included development and access to new technologies such as VoIP and mobile broadband Internet as UAS objectives. Due to UAS funding requirements imposed on the incumbent fixed-line telecommunications provider (i.e., UTL), VoIP was illegal in Uganda in order to safeguard the incumbent from competition (InfoDev/ITU, 2011; NETO, BEST & GILLETT, 2005). As of 2005, Uganda approved provision of VoIP services and required VoIP operators to contribute to UAS funds (MULIRA, KYEYUNE & NDIWALANA, 2010).

Including social factors in the design of UAS policies

The UCC outlined the need to develop telecommunications services that target the most marginalized of users, particularly women, youth, and the disabled in its Rural Communications Development Policy of 2001. However, a 2009 study of the RCDP implementation in 14 districts of Uganda revealed discrepancies between policy conception and implementation (MADANDA, OKELLO & BANTABYA-KYOMUHENDO, 2009). The study identified that the RCDF did not mandate that subsidy applicants indicate how the needs of women, youth, and the disabled were to be met with rural telecommunications projects, therefore rural projects tailored themselves to dominant market demands and continued to exclude marginalized communities (MADANDA *et al*., 2009). For example, women tend to be in charge of household tasks and are constrained by cultural norms that discourage their participation in public affairs (*ibid*.). The public computer centers were open during daylight hours when women would need to be completing household tasks. Findings revealed that both men and women used public computer facilities developed with RCDF funds, but men used the facilities more frequently and for business and education purposes whereas women used the facilities to maintain kinship networks (*ibid*.).

Alignment of UAS objectives with national social programs

In its UAS policy, Uganda explicitly outlined provision of broadband Internet connectivity to all institutions of learning, health, and governance as a means to strengthen achievement of the Millennium Development Goals (MDGs) (UCC, 2009b, p. 27). Shortcomings in the coordination of rural development initiatives that target the MDGs and ICT development have been identified (TUSUBIRA, 2006). The UCC notes that the Ugandan government has been unable to provide widespread e-education, e-banking, e-commerce, and e-government services due to lack of expertise, resources and insufficient infrastructure (UN, 2009). Uganda is following the ICTRT guidelines to utilize market demand to stimulate development of services that align with national social programs to achieve the MDGs. MTN Uganda, a private company, attempted to complete such a task by partnering with Grameen Foundation and Google Search in 2009 to develop a suite of mobile phone applications that provide text messaging and databases of relevant information to rural and/or poor communities. The mobile phone applications included weather forecasts, agricultural advice, health tips, location of medical facilities, and an online marketplace that connects buyers and sellers of goods and services (MTN Uganda, 2009).

■ Discussion: Hitting or missing the UAS objectives?

By liberalizing its telecommunications sector, allocating smart subsidies, conducting reverse auctions, and incorporating technological convergence in UAS objectives, Uganda has been able to encourage entry of numerous mobile telecommunications and Internet providers. These adjustments may propel Uganda from its current position as an emerging mobile telecommunications market to a developed market (see Ernst & Young, 2009). While Uganda has made great progress over the past few years, the UCC states a goal of decreasing public funding of these projects until they are solely financed by private entities (UCC, 2009b). By relying solely on market forces to ensure robust competition, particularly in rural areas, the UCC is making premature assumptions on the state of current and future market forces. Leaving the fulfillment of UAS objectives solely to private entities and the market is concerning. Relying on market competition, instead of government oversight and provision of financial incentives, operators may be less likely to invest in rural, less profitable areas. For example, because of political instability and insurgency, the RCDF served a

pivotal role in allocating funds for mobile telecommunications and broadband Internet infrastructure development in the northeastern region of Uganda (AKPONG-OBONG *et al*., 2009; IDRC, 2011). Still, today, mobile telecommunications infrastructure (see figures 3 and 4) and social services in the region are underdeveloped due to chronic violence, social turmoil, and presence of camps for internally displaced persons (MSF, 2011). Reliance on market conditions to promote universal service in neighboring Kenya has led to the same result: introduction of numerous providers in the country that invest in urban rather than rural areas (KIRUI & MAHATIA, 2005).

Providing access to telecommunications does not guarantee valuable use. Scholars emphasized a need for consumer demand to stimulate technological development and adoption. Encouraging demand for advanced services requires development of locally relevant information such as job advertisements, commodity prices, health information, agriculture information, weather, e-government, e-education, e-banking, public service announcements, etc. (LING & DONNER, 2009). Uganda has followed the ICTRT guidelines to utilize commercial solutions rather than policy solutions. However, dependence on the private sector to create locally relevant content may be insufficient. It is recommended that the UCC mandate that operators take stock of the development needs of rural communities they are expected to serve and report these needs to the UCC so that synergies may be created between national programs and operators' dissemination capacities.

While access to mobile telecommunications and broadband Internet may be a viable goal for increasing access to information in developing countries, these services will not be used unless devices and terminals are affordable. KIM, KELLY & RAJA (2010) point out that the "One Laptop Per Child" $100 laptop manufactured for developing countries is more than a third of GDP per capita in four sub-Saharan countries and the other "economic" option, a $400 laptop from Intel, costs more than the gross domestic product (GDP) per capita in nine sub-Saharan African countries (KIM *et al*., 2010). As of 2009, Uganda's annual GDP per capita was $490, placing both of these laptops out of reach of most of the Ugandan population (World Bank, 2011). As of 2008, it was reported that Ugandans could purchase a refurbished mobile phone for $25 and that a mobile phone call during peak hours could cost up to 25 cents per minute (Burrell, 2008). A monthly mobile broadband connection ranges from $25 to $61 for 1GB (WOUGNET, 2009). These prices include a 30% duty imposed by the Ugandan government on mobile phone handsets and services (GILLWALD, 2010; ITU, 2010b). Again, if the government wants to promote citizen use of mobile telecommunications services, the government should not rely solely on private corporations to

offer services in an equitable manner. The government must further lower the duty imposed on mobile devices and services and subsidize the cost of the device and service for low-income users. A final weakness of the UCC UAS framework is the lengthy time process the RCDF takes in awarding subsidies. For example, over half of the telecommunications needs in communities seeking a RCDF subsidy were achieved by the leading GSM operators, UTL and MTN Uganda, before the RCDF awards were provided (InfoDev/ITU, 2011). The inefficiency of the RCDF in awarding subsidies hinders firms that could complete UAS objectives with assistance from RCDF subsidies.

As for competition in the development of infrastructure and provision of mobile broadband services, the UCC's use of smart subsidies and reverse auctions revealed that telecommunications providers not Internet Service Providers (ISPs) were able to provide the lowest bid. UCC granted an exclusivity period to UTL and MTN Uganda as "national telecommunications operators" and allowed them to serve under a duopoly for a five-year period. The five-year duopoly allowed UTL and MTN Uganda to develop strong fixed-line telecommunications, mobile telecommunications, and the bulk of the broadband transmission network through installing fiber optic cables across the southern region and microwave links reaching all other areas (MULIRA, KYEYUNE & NDIWALANA, 2010; DJIOFACK-ZEBAZE & KECK, 2009). As market power grows, it seems that a duopoly may reappear with UTL and MTN Uganda providing the sole infrastructure and service for mobile broadband Internet.

■ Conclusion

This paper analyzed the applicability of the ICT regulation toolkit universal access and service policy guidelines for developing countries. The five main UAS guidelines indentified included: (1) incorporating incentives and roll-out obligations into telecommunications licenses and development of a UAS fund; (2) emphasizing commercial solutions rather than forming UAS policy solutions; (3) including new technologies and technological convergence in UAS objectives; (4) including social factors in the design of UAS policies; and (5) aligning UAS objectives with national social programs. Incorporation of incentives, roll-out obligations and development of a UAS fund has promoted widespread development of mobile telecommunic-ations across Uganda. However, social and political turmoil in the northeastern

region has affected volunteered investment. Without the heavy-handed help from the RCDF, development in the region would not have occurred. Furthermore, use of incentives, roll-out obligations, etc. favor telecom "access" over usage (with the latter being conditioned on user's technical skills and access to relevant content).

Relying 100% on commercial solutions rather than UAS policy solutions may lead to further disenfranchisement of certain sectors of society. There is a distinction that should be made between infrastructure and service investment and the role of policy versus commercial solutions. Infrastructure development has large sunk costs therefore policy solutions such as subsidies may be needed. On the other hand, there may be an incentive for the operator to collaborate with local stakeholders to produce locally relevant content to encourage adoption in geographic areas already being served. In regard to infrastructure development, it seems policies encouraging 100% commercial investment may not be the best recommendation.

If UAS policies are to be socially inclusive, they must take into account the social and economic constraints of rural communities. Demand for telecommunications services is likely to be constrained by a lack of perceived locally relevant uses, high levels of illiteracy, social and cultural norms that dictate use, and financial barriers. It is recommended that the UCC and the ICTRT incorporate the following socially inclusive policies: (1) incorporate digital literacy training of citizens and provide annual reports concerning the needs and social constraints impacting women, youth and the disabled; (2) encourage governments, local stakeholders and operators to co-create rural development-based content so as to foster co-achievement of MDGs; and (3) subsidize telecommunications hardware, software and services.

In summary, the five ICTRT UAS "best practices" highlighted in this paper have served as a fairly positive guideline for Uganda. The Uganda case highlights that not all "best practices" policies should be adopted verbatim but should be adapted to fit local needs. Counter to ICTRT recommendations, complete reliance on market mechanisms is not recommended. More research must be completed on the opportunities and barriers that affect utilization of ICTs for social and economic development. It is important that the Ugandan government increase its development of e-social programs in collaboration with telecommunications operators. Doing so will likely strengthen demand for telecommunications services and viability of operators, as well as achievement of long-term development goals in Uganda.

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