High Cost Of internet Connectivity In Africa: How Do We Achieve Mobile Telephony Success Story?

G. M. Muwanga, Mbarara University
Email: muwangam@yahoo.co.uk

INTRODUCTION

The basic requirement for meaningful use of any web-based tools is to be able to have hassle-free access to the internet. Information and Communications Technologies (ICTs) can only serve as effective tools of broad-based development and opportunity for all if all people in developing countries can afford access to them (Khalil, 2003). However, underdeveloped or even complete absence of telecommunications infrastructure is hampering use of ICTs in rural remote areas (Mandioma et al., 2007; Adomi, 2005; CIPESA, 2005). Broadening the reach and affordability of these technologies and services to rural Africa remains a complex and difficult challenge. This is because terrestrial telecommunications infrastructure requires substantial investments that are often unaffordable for the public sector and don't make economic sense to the private sector (Songan, et al., 2004; Chatelain and Van Wyk, 2007; Fibre for Africa, 2007b; Hasson, 2008). Yet affordable and reliable internet accessibility in poor rural areas will extend the attendant beneficial impacts of ICTs. However, all this will depend on a number of key factors. These include (i) Low-cost, reliable communications infrastructure being built in rural areas. This goes hand in hand with increased awareness of the value-added services brought about by internet connectivity, which will in turn create the requisite demand and justify the massive financial and technological investment. (ii) A supportive and effective legal and regulatory environment being created and maintained, to ensure competitive markets for communication services (iii) Governments providing incentives to private sector investment that lead to the expansion of affordable internet accessibility to rural areas through a range of pro-active policy, regulatory and investment measures, including public-private sector partnerships, where appropriate. The ultimate measure of the value and impact of ICTs in development are the desired outcomes that have a bearing on the Millennium Development Goals, i.e., reduction in poverty levels, thriving African economies, reduced disease, increased literacy, etc.

COST OF INTERNATIONAL BANDWIDTH

Hesselmark (2003) compared cost of surfing the internet in different African countries and observed that there was some inter-country variation. Some anecdotal reports maintain that internet accessibility for an individual in Africa costs about 300 times compared to that in most European countries. Mode of accessing internet largely determines cost of bandwidth. According to AfrISPA (2007), the cheapest dedicated one megabyte of bandwidth in Kenya went for US$4,000 (KSh280,000), compared to South Africa where one megabyte costs US$300 (KShs 21,000). This disparity came about because Kenya accesses bandwidth via satellite links, while South Africa uses fibre optic cables, indicating that bandwidth via satellite is far more expensive than wired bandwidth. Another example comes from Ghana. By 2004, a monthly half circuit 2Mg (E1) bandwidth cost between US$4,000 and US$6,000 over satellite while the same bandwidth cost US$12,000 over the SAT3 undersea cable which lands in Accra (Oskiakwan, 2007). This is even ironic since, as noted above, bandwidth accessed via fibre optic cable should be far cheaper than that accessed via satellite.

The situation in Uganda is such that due to high cost of bandwidth, some institutions can only afford very low bandwidth. For example, Mbarara University pays US$2190 per month for a bandwidth of 384 kbps. This translates into very slow and frustrating internet connectivity, and to prevent slowing the system even further, many computers on university campus are not connected to the internet. This seems to be a problem that is common to many African countries (Jensen, 2004; Adomi 2005; The Economist, 2007; Fibre for Africa, 2007a). Osiakwan (2007)

suggested the existence of a cartel among various satellite operators since, despite liberalisation and competition in some African countries, internet connectivity is still expensive. Yet in other regions of the world where cut-throat competition is taking place, there has been an explosive penetration of mobile telephony and broadband services, thus driving prices down (Frost and Sullivan Report, 2008). According to CIPESA (2005), issues related to Internet Governance are not the main hindrance to usage of internet in Africa, but rather due to (i) the technology currently deployed being expensive (ii) cumbersome and expensive licensing procedures (iii) Internet Service Providers (ISPs) profiteering from high charges for their services. Hesselmark (2003) shares the same view. In addition, internet costs and accessibility may be dependent in part on whether a country is landlocked or has direct access to an international fibre connection (undersea cable landing site). The so-called 'monopoly' country (i.e., one with direct access to an international fibre connection) sets the price, and other countries have to accept this price or use an alternative, which is usually satellite (Fibre for Africa, 2007d, 2007e). As noted above, this is still an expensive alternative.

INTERNET VIA SATELLITE

Because the 2G (second generation mobile phones) which depend on GSM (Global Service for Mobile) technology could not support Internet very well, other technologies such as Wi-Fi (Wireless fidelity), and Wi-Max (Worldwide Interoperability for Microwave Access) have come up as strong viable alternatives to mobile telephony for accessing and distributing internet on the African continent (Odufuwa, 2003). Combined with VSAT (Very Small Aperture Terminal – a small satellite earth station), these technologies have been used to provide internet connectivity to great effect (Hegener, 2002; B-SPAN, 2004; CIPESA, 2005; Mandioma et al., 2007; Aghion, 2008; Hasson, 2008). Satellites will continue to beat all terrestrial infrastructure, anywhere on earth, when it comes to broadcasting Internet files (Hegener, 2002), and they are extremely effective in reaching places where volume of traffic would not justify a fibre connection (Fibre for Africa, 2007c). Prices for end user hardware are coming down very rapidly, and more user friendly ways of billing are reducing prices even further (Hegener, 2003; Jensen, 2004). According to Jensen (2006), one way to boost access and usage of internet in Africa is opening up markets to allow low-cost wireless and VSAT connections.

Broadband via satellite still remains more expensive compared to 'wired' broadband (through fibre optic cable). In addition, accessing internet via satellite still requires deployment of certain infrastructure, such as satellite dishes, by the end user. Satellite dishes are sold mainly by International Telecom companies, implying that there is some capital flight from the continent through this process. Moreover, the satellite dish is the single, most expensive item. This, coupled with usually cumbersome licensing procedures, makes satellite connectivity a not very attractive option for individual internet access in developing countries. Therefore, I argue that mobile telephony devices remain the best option for distributing internet in Africa.

MOBILE TECHNOLOGIES AND THE INTERNET

The main underlying factor that led to explosive mobile telephony availability was the failure of African government-owned telecommunication companies to provide cheap and efficient telephone services, thus failing to satisfy the huge demand for communications' utilities on the continent. The process by which Africa embraced the mobile phone was accelerated when conditions for fair competition were created while at the same time technology allowed for connection of thousands of people at lower costs (CIPESA, 2005). Probably these are some of the factors have made mobile telephony in Africa relatively more successful. The phenomenal mobile telephony take-up in Africa has surprised even the mobile phone service providers (Kinoti, 2006). Thus Africa has got the highest growth rate of mobile phone connections in the world, and the mobile phone has become the centre of the continent's connectivity successes (Butler, 2005; CIPESA, 2005;). Gerster and Zimmermann (2003) concur, and go on to suggest that a combination of mobile telephones and internet would seem to be an 'appropriate technology' for Africa, given the high penetration of mobile phones and low internet penetration. Moreover,

(Odufuwa, 2003) predicted that poor usability of mobile phones as internet access devices would be sorted out once internet merged with, and converged into, mobile devices that supported both cellular and WiMAX/Wi-Fi standards.

Mobile technologies tend to have an advantage over other technologies in that they overcome most physical infrastructural barriers, this being a crucial factor in rural and remote settings where the majority of Africans live. Further more, in developing countries, mobile, nomadic and handheld technologies have the capacity to gather, store, deliver and enhance information in ways that are quite unique compared to the situation in developed countries (Traxler, 2006). So, is it possible to use existing mobile telephony infrastructure for distributing internet in Africa? I would say yes. Mobile phones have provided an example of leapfrogging technology, whereby emerging technologies have brought internet to the cell phone, thus obviating the need to own a Personal Computer (PC) for connecting to the World Wide Web (WWW) (Butler, 2005). Perhaps the inherent limitation of the 2G (second generation) mobile phones using GSM technology to support broadband internet has been a great hindrance in this regard. But the situation is rapidly changing with the evolution of 3G (third generation) mobile phones. 3G networks are 'wide area cellular telephone networks' which, due to growing demands in network capacity, were designed to incorporate high-speed internet access, among other things. They are able to support wide-area wireless voice telephony and broadband wireless data transfer, all in a mobile environment. Already 4G (fourth generation) technologies, which are likely to incorporate global positioning services (GPS), are being developed. The all-wireless broadband era is quickly approaching, and 4G will eliminate the gap between mobile and fixed broadband (Nortel, 2007).

SOME INFRASTRUCTURAL, POLICY AND REGULATORY ISSUES HINDERING CHEAP INTERNET ACCESS

Regarding infrastructure, routing of local African traffic through international connections significantly contributes to high cost of internet connectivity. It is estimated that this phenomenon costs Africa about $400 million annually, this cost being largely passed on to the individual consumer of internet services (Zuckerman and Osiakwan, 2006). This also represents a major capital flight from the continent. Some governments, fearful of losing their control over the national telephone network, are still reluctant to completely free their telecommunication services. Hence, in some countries, state-owned inefficient telecom companies still maintain monopolies or duopolies, thus stifling competition. In absence of fair competition, cost of services and tariffs are arbitrarily high, leading to profiteering by these companies in exchange of mediocre services. In certain instances, rules and regulations for licensing new ICT ventures are frustratingly slow and laborious, leave alone having to work with outdated legislation. Due to corrupt tendencies, some regulatory agencies may exhibit poor work ethic, leading to foot-dragging and incompetence. In the developing world, some political leadership may prefer to preside over an ignorant population, and hence would rather maintain the status-quo. Indeed some African governments regulate access to the internet. On the other hand, some politicians, who are not ICT savvy and yet are the decision-makers, may never appreciate the apparent connection between ICTs and national development.

The proper approach to optimally harnessing ICTs for development and poverty reduction is to deploy pro-active, competition-centered, market-friendly regulatory frameworks that support and sustain both ICT investment and penetration *(*InfoDev, 2007). The current trend is for the public sector, the private sector and civil society to enter partnership in development of ICT policies (Adam et al*.,* 2007, p.4).

CONCLUSION

In the above account, I have mentioned some alternatives for accessing and distributing internet reasonably cheaply. These alternatives, i.e., combination of satellite and wireless internet solutions, have been advocated for by various authors and, theoretically, they seem to offer a quick fix to the teething problems associated with internet access in Africa. However, in my view,

they can't offer a near-complete solution as long as they require certain infrastructure, such as a satellite dish, and availability of a PC (or other form of computer) in order to hit the WWW. In Africa, as indeed may be the case in other parts of the developing world, a sizable section of the population owning a computer at individual level will take a few more decades to happen. In any case, owning a laptop or a PC in order to access internet would not be necessary if appropriate hand-held devices were made available cheaply. One reason why mobile telephony has had a phenomenal penetration is fact that the phones have become cheaper and cheaper, to the extent that many Africans, given their level of income, are able to purchase one. Obviously there is a limit to how low prices can go, but there is no doubt low prices have contributed tremendously to the almost ubiquitous mobile phones on the African continent. Satellite and wireless technologies, where necessary, should only come in to provide the 'last mile' access to internet, but the final end-user accessibility should be provided by a mobile handset.

In conclusion, I argue that if internet accessibility is to match availability of mobile telephony in Africa, then the ultimate means of accessing internet should be convenient, appropriate and reasonably cheap in the African context. In my view, the mobile computing devices are well placed to satisfy these conditions. The convergence of mobile telephony with internet on one and the same computing device is a welcome development. All that is required now is to put in place policy and regulatory measures that will result in affordable internet accessibility from Internet Service Providers (ISPs), and the technology that would lead to production of cheap mobile hand-held computing gadgets. Literature has got examples of cheap, robust computers designed specifically for African conditions, such as the 'One Laptop Per Child' project. I suggest that similar cheap, robust mobile hand-held devices be developed to deliver both internet and mobile telephony to the African populace.

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