



Business models for equitable access¹

Muriuki Mureithi²

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² Muriuki Mureithi (Mureithi@summitstrategies.co.ke) is an independent ICT consultant working with Summit Strategies in Kenya. He has been passionately engaged in ICT development in Africa for the last decade, having participated in the design of the African Information Society Initiative (AISI) in 1996. His contribution is through independent consulting and research, with experience in more than twenty countries in Africa, assisting in the establishment of ICT strategies and programmes.

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Executive summary

Recognising the potential of information and communications technologies (ICTs) for socioeconomic development is the first critical step towards exploiting their benefits. Yet a gap exists between the opportunity and the exploitation. The challenge is multifaceted and the consumer, the supplier, as well as the governance of the policy and operating environment have a role to play.

There are a range of business models that are being implemented to address the issue of access to ICT infrastructure. Each model has its strengths and weaknesses and is being implemented in different situations. The best business model to apply is contextual, and a key feature is sustainability. There are challenges in implementing business models, and all stakeholders, or a combination of stakeholders, have a role to play to make the models more effective.

Long-term sustainability calls for business models that work. These business models need to take into account the management of the cost structure and revenue streams.

Communities need to change their mindset and accept that they can contribute and, indeed, initiate their own access solutions. For operators, their long-term interests will be served by developing rural markets – by providing services at cost or below cost with a view of long-term market growth. Governments also have a range of policy and regulatory tools which can expand access. With all players engaged, the goal to provide equitable access will be realised in a “win-win” framework.

This issue paper is one of a series of four on aspects of equitable access to infrastructure commissioned by the Association for Progressive Communications (APC).

1. Issues at stake

While the growth of ICTs has been phenomenal in the last decade, coverage and access are still limited to areas that are highly populated, or areas where incomes are high and can therefore sustain profits. According to the chairman of the GSM Association in Africa, cellular services on the continent cover up to 60% of the population, and 90% of the population in ten countries have access.³ Despite the high coverage, it still leaves pockets that do not have access to the GSM network, and people in areas with coverage who are not able to use the

³ Olunga, V. (2006) Promoting Sustainable Telecommunications Growth in East Africa. In *Connecting Rural Communities Africa Forum 2007*. Nairobi: Commonwealth Telecommunications Organisation.

signal. Regarding internet access, only 2.5% of Africa's 900 million inhabitants are online, compared to a world average of 16%.⁴ The twin challenge of access and the capacity to exploit it calls for innovative business models that extend coverage and address capacity to pay, among other issues.

The reasons advanced for a lack of coverage and use involve the supply side, i.e., the providers of access, including the equipment manufacturers; the users, or the demand side; and governance issues relating to managing access to infrastructure. Managing the relationship between these three, and providing support and interventions to create enterprises and entrepreneurs, increasingly appears to be the sustainable way to reach the vast rural areas without access.

On the supply side, the issues that operators face include a lack of physical infrastructure, such as poor roads and a lack of power, as well as low population density. Investment in ICT infrastructure per capita is higher in rural areas, with lower revenue generation. This prompts operators to prioritise urban areas.

For consumers, on the demand side, capacity to pay for services is a major challenge. A lack of skills and ICT literacy also inhibit use in rural areas.

Some governments impose restrictions on the use of technology that is best able to serve underserved areas, like VSAT satellite and wireless, or close telecommunications markets, as is the case in Ethiopia. The imposition of high licence fees can make providing services to underserved areas commercially unattractive. In other cases, the governments have shielded monopoly operators. Without competition there is no motivation to drive operators to certain areas of the market.

Universal access funds also have issues that need to be addressed to strengthen them and make them more effective, including:

- *Defining rural areas: Not all rural areas are the same and need the same level or kind of support.*
- *Misunderstanding between rural initiatives and operators: What rural fund managers think is commercially viable is not necessarily accepted by operators. Some areas designated as potentially commercially viable after a start-up operator has been given funds, are considered unviable by operators, even after support by a fund.*

⁴ International Telecommunication Union (2006) *World Information Society Report 2006*. Geneva: ITU.

⁴ APC issue paper "Business models for equitable access", by Muriuki Mureithi, 2008

- *Open access to national and regional infrastructure: Duplicating infrastructure in rural areas makes access expensive. National and cross-border roaming can reduce the need for infrastructure and help reduce implementation costs in rural areas.*

Rural infrastructure has to be interlinked with national and regional networks to provide national and global connectivity. Consequently, efforts to roll out ICTs to rural areas go hand in hand with the efforts to provide national and regional connectivity. In Africa, regional connectivity projects have involved providing cross-border connectivity to avoid high transit costs, often through Europe, as well as laying submarine and terrestrial fibre to increase bandwidth. Many of these projects have faced challenges with their business models.

Sustainable access to infrastructure calls for innovative strategies and business models. What then are the business models that are sustainable? Firstly, it is imperative to clearly understand the concept of a business model. Osterwalder posits that business models define a business logic and can be reduced to four generic clusters.⁵ These clusters relate to infrastructure, the offering, the customer and finance. Businesses manipulate various aspects of the clusters to transform technical inputs to economic advantages in order to be competitive and sustainable.

In the case of ICT infrastructure, this description helps to understand the challenges that stakeholders have to face to ensure equitable and sustainable access. These clusters are relevant to ICT access business models in the following way:

- *Infrastructure: This involves leveraging the networks of the national operators to create value for the target community, while developing the necessary skills to extend the infrastructure further into rural areas. The technology choices include wireless and wireline. Due to the predominance of cellular, an increasing number of business models are now based around the cellular signal.*
- *Offerings: This includes a range of services, driven by the end-user (community) or by the supplier, to encourage use. These range from single services (e.g., voice and data) to multi-purpose and advanced services in education, health, etc.*
- *The customer: The customer's perspective should shape the service, and the most appropriate channels to deliver the service.*
- *Finance: This focuses on revenue streams, defining whether the end-user pays in full, in part, or if external agents pay. Cost structures need to be managed to reduce costs. In the past, development partners funded the cost of telecentres,*

⁵ Osterwalder, A. (2004) *The Business Model Ontology: A Proposition in a Design Science Approach*. Ph.D. thesis, Université de Lausanne, École des Hautes Études Commerciales.

but today the trend is for self-sustaining local entrepreneurship. The private sector is now a significant player. Government funds can also be leveraged, and e-government services on-sold.

By manipulating these four clusters, many business models have been developed to enhance equitable access.

2. Practical strategies at the local level

Stakeholders have developed innovative and practical strategies to expand access to infrastructure for marginalised people. Recurring features include:

- *All the business models innovate on cost structure by reducing costs through choice of technology or covering capital costs through donor or government support, in-kind community resources, or gifts. The business models also manage operational costs by lowering overheads or tariff rates. They optimise on revenue streams by expanding revenue streams where possible without making the service unaffordable. The focus is cost management.*
- *Partnerships that engage various players at various levels win. All partners can bring their core capabilities and benefits to the synergy. The benefit need not be financial.*
- *Development partners have played and continue to play a very important role in creating awareness of ICT access in rural and poor neighbourhoods. However, local stakeholders should also take responsibility for long-term sustainability.*

Different models and how they manage the finance component are illustrated in Table 1. Ó Siochrú and Girard have extended the models to include community-driven networks.⁶

Table 1: Features of business models for equitable access

Institutional arrangements	Type	Typical offerings and configuration	Example	Cost structure - managing CAPEX/OPEX	Revenue streams - pricing core/auxiliary services
Telecentre	Basic	Simple email services for a community	Widespread	In-kind resources from community or development partner	Internet services, office services e.g. typing, fax, photocopying
	Civic	Institutional support to provide services with priority to institutional members	Widespread	Access to institutional infrastructure	Voice, data – subsidised
	Multi-purpose	Multiple services – communications, office services and information services	Sengerema in Tanzania	In-kind community resources, development partner support	Multiple – voice, data and office services
	Phone shops	Single service in the community	MTN village phone Uganda	Low overheads and signal at cost from operator	Voice

⁶ Ó Siochrú, S. and Girard, B. (2005) *Community-based Networks and Innovative Technologies: New models to serve and empower the poor*. United Nations Development Programme (UNDP).

Information centres	Community knowledge centres	Social empowerment through information sharing on food security, livelihoods etc. from Open Knowledge Network	Arid Lands Information Network (ALIN) - East Africa	Development partner support, cheap internet connectivity, community in-kind support	Commercial subsidiary Baobab established, profits ploughed back into the social work of ALIN
	Digital villages/district business centres	E-government contractors, information to the community, communications services	Kenya Ghana	Government infrastructure Subsidised bandwidth	Contractor of e-govt services; voice, data, office services
Mini-telcos	Community-owned networks	Networks built to serve an area or community using a combination of technologies	Fantsuam, Nigeria Nepal wireless network project	In-kind support from community, gifts, development partner support to cover CAPEX	Multiple services often supplied through village-based centres
	Municipal networks	Under-development	Kinshasa		Multiple
	Cooperatives	Built by cooperatives	US, Poland, Argentina	Low return on investment	Multiple services
Entrepreneurial	Phone shops	Mobile or fixed-phone service	Senegal simu ya jamii; Kenya Cote d'Ivoire	Low overheads ("chair and table"), mobility of operator	Voice
	Cyber-café	Small, standalone, to chain model in cities and towns	Widespread	Cheap PCs, market segmentation	VoIP, data
	Franchise networks	GSM-based mini-network	India, piloted by Nokia Siemens	Purchase airtime at bulk tariff rates	Voice, SMS
	Mobile access points	Implemented on Tuk Tuk	Indonesia, piloted by Alcatel	Mobility for the consumer	Voice, data

Entrepreneurial models tend to be in well-off areas, while the other models target disadvantaged communities. All the models compliment each other to provide access.

“Win-win” and empowering partnerships for phone shops

MTN village phone shops provide an innovative strategy where all partners win. The strategy is based around creating village entrepreneurs to manage cellular services through a partnership between MTN as service provider, micro-credit organisations, and a village entrepreneur. This model is inspired by the Grameen phone model, which aggregates demand among the poor people in Bangladesh. According to Richard Mwami (senior manager of public access at MTN), each partner brings on board its core competence: the micro-credit organisation selects and trains the village entrepreneurs, and extends credit, while MTN trains the entrepreneur in the technology and application of the phones. MTN also provides the signal booster to extend reach. Village phone entrepreneurs work with multiple micro-finance institutions as partners who ideally offer a six-month loan product.⁷ By 2007, 9,000 phones had been installed against a target of 6,100. This is a demonstration of the success of the concept.

The idea is a “win-win” for all stakeholders, which is a basis for sustainability:

- *The operator increases traffic to its network.*
- *The micro-credit financier realises a return based on call revenue.*
- *The village phone operators realise a healthy retail margin with a net monthly revenue in excess of USD 22.*
- *The community accesses cheaper communication.*

A key lesson is the need for strong high-level organisational relationships with shared goals and long-term commitment where all parties have a stake in the partnership.

Innovative commercial funding for community information centres

Concerned by the changing interests of the donor community, one non-governmental organisation (NGO), Arid Lands Information Network-Eastern Africa (ALIN-EA),⁸ has designed a strategy to overcome donor dependence. In an interview for this paper, the director of ALIN, James Nguo, stated that ALIN sought funds from development partners to start a for-profit activity in line with the mission of the organisation. The profits of the commercial

⁷ Mwami, R. (2007) A Case of the MTN Village Phone in Uganda. In *Connecting Rural Communities Africa Forum 2007*. Nairobi: Commonwealth Telecommunications Organisation.

⁸ ALIN-EA: www.alin.or.ke

activity would be ploughed back to support the work of ALIN. Consequently, in 2002, Nguo led his staff in forming a technical arm of ALIN, Baobab Communications (BaoCom), as a profit-making enterprise.

BaoCom seeks to fulfil the ICT needs of development organisations by supplying affordable products and services. At the end of each year, profit generated by BaoCom is transferred to ALIN to support its social mission.

Nguo's dream is to cover all the administrative costs of ALIN from the commercial operations of BaoCom, and therefore invest all donor funding received in social projects. In the meantime, community members provide in-kind support for ALIN, such as security.

Sustainable community mini-telcos: A case in Nepal

The dream of Mahabir Pun, Nepal Wireless team leader, to connect the Himanchal High School of Nangi in Nepal to the internet, was realised with the completion of the Nepal Wireless Networking Project. According to Pun et al, he has gone even further than that: the project now connects fourteen villages, and has expanded its basic voice and internet services to include telemedicine and distance education.⁹ Each village is a communication centre and sets access tariffs to be sustainable. The network itself has an arrangement with Nepal Telecom (NT) that offers a discount on calls terminating in the NT network.¹⁰ This discount is extended to the village that originates the call. Through this traffic, and the services offered by the communication centres, the network has been able to cover operational costs. Capital costs were covered by responses to an appeal for support, including equipment. Operational costs are coming down after the government agreed to eliminate licence fees for frequency spectrum.

Entrepreneurial franchise networks: GSM mini-telco

According to Rauno Granath of Nokia Siemens Networks, rural areas present new business opportunities, but require innovative strategies to capture markets. Village Connection is such an innovation, based around a mini-network that allows village traffic to be switched

⁹ Pun, M., Shields, R., Poudel, R. and Mucci, P. (2006) *Nepal Wireless Networking Project: Case Study and Evaluation Report*. Available at www.nepalwireless.net

¹⁰ Voice over internet protocol (VoIP) calls are routed through a network server and placed on the NT public switched telephone network (PSTN)

locally among neighbouring base stations, and enables local operation and subscriber management. The solution can be powered by solar power in the absence of electricity.¹¹

Operators would ideally franchise this solution to a village entrepreneur. It is a “win-win” for all with:

- *The operators capturing the rural market at lower capital expenditure and operating costs*
- *The entrepreneur growing a business*
- *The village getting connected.*

Experience suggests that at least 100 families would need to be in a coverage area to make the investment worthwhile.

3. National and regional infrastructure

While regional connectivity is secured through laying fibre optic cables, the challenge for the cables lies in the business model. According to Walubengo,¹² three business models are prevalent:

- *Commercial (privately provisioned) model: The internet backbone providers use their own money to sink a cable and they independently decide who connects to the cable’s landing (exchange) points, and at what rate per month. These private companies are run on a purely commercial basis with the aim of maximising profit within the shortest possible time.*
- *Partly commercial (consortium) model: A typical example is the SAT-3 cable that runs along west Africa. At its simplest level, SAT-3 grouped together mainly government-owned (public) telcos across the affected coastline to form a consortium with a view to seek funds and build the fibre. The operators retain the privilege of independently deciding who connects to the cable and at what rate per month. In the case of SAT-3, the monthly rates charged are very high compared to similar services offered in developed economies, partly due to the monopoly control of incumbent operators, and low demand.*
- *Open access model: In the simplest terms, the open access model is premised on the argument that socioeconomic development hangs on the availability of cheap*

¹¹ Granath, R. (2007) Nokia Siemens Networks Village Connection: Affordable connectivity for rural villages. In *Connecting Rural Communities Africa Forum 2007*. Nairobi: Commonwealth Telecommunications Organisation.

¹² Walubengo, J. (2007) Online Discussions on the East-African Submarine Optical Fibre Cable. eDiscussion Report: January 22nd-February 10th 2007. Nairobi: KICTANET.

bandwidth or communication costs. Its proponents suggest that fibre should be co-owned by both government and the private sector, but should not be operated on a for-profit basis. Rather, it should be run at cost by a body constituted to operate and maintain the cable, known as a special purpose vehicle (SPV). Access or connection to the cable should be open to all stakeholders wishing to connect. The fundamental point is that money should not be made out of the cable; money should instead be made out of services (business process outsourcing, e-commerce, etc.) that would arise from the presence of the cable. The open access model foresees a low-cost, high-volume business model for the cable.

Kenya's ambitious model for international and national connectivity

After waiting for decades, Kenyans will have more than one submarine and terrestrial fibre to choose from, courtesy of a combination of government and private sector initiatives. The country is now engaged in four submarine fibre projects, with some completion dates as early as the last quarter of 2008. For example, the TEAMS project (see Table 2) aims to hasten the provision of bandwidth and, in the longer term, ensure competition when other submarine cables land. The key driver is to provide cheap bandwidth to support ICT-enabled activities, including digital villages and business process outsourcing. It is envisaged that the project will offer bandwidth at cost. These initiatives wean Kenya away from exclusive reliance on satellite or microwave, so that it can reap the benefits of the information society. It is a radical transformation of the Kenyan ICT scene, and a leap of faith into the optic era.

Table 2 : Submarine cable initiatives that will supply Kenya with additional bandwidth

Project	Participating parties/promoters	Configuration	Business model
Eastern Africa Sub-marine Cable System (EASSy)	22 telecom operators from 20 countries	The EASSy submarine network will span nearly 10,000 km, linking eight countries from Sudan to South Africa via Djibouti, Somalia, Kenya, Tanzania, Madagascar and Mozambique.	The overall project cost will be in excess of USD 200 million. An SPV and direct investors will be used for funding.
The East African Marine System (TEAMS)	Kenyan government with Etisalat of the United Arab Emirates (UAE), regional operators and private investors	Fibre optic cable link between Fujairah and Mombasa.	Under the TEAMS agreement, the Kenyan government will have a 40% holding in the project, Etisalat will hold 15%, and the remainder will go to investors in the East African region. The public will purchase shares through an initial public offer (IPO) on the Kenyan Stock Exchange.
Fibre-optic Loop Across the Globe (FLAG)	Kenya Data Network (KDN)	KDN will link from Mombasa and terminate in an undersea junction in international waters off Yemen.	Independent funding from company for the USD 115 million project.
SEACOM	Tyco Telecommunications	13,000-km undersea fibre optic network will provide connectivity between South Africa, Madagascar, Mozambique, Tanzania, Kenya, India and Europe.	Privately-funded submarine fibre optic cable system.

Source: Summit Strategies

4. Support and interventions

Access cannot be an end in itself, but only a means to benefit the lives of people. To ensure equitable access to ICT infrastructure, several interventions are necessary.

Policy

It is necessary for governments to recognise the special challenge of the rural and poor populations with regards to access to infrastructure. At present, conventional private sector business models fail them, as can be noted by insufficient coverage in rural areas. Detailed studies are required to identify areas without access and the capacity of communities to buy access services. Based on these, the government needs to develop a policy framework to provide equitable access. The framework should ideally offer incentives for service providers and the community, and a regulatory regime to guide these incentives for long-term sustainability.

The policy framework should address and create linkages with other non-telecommunications challenges like the provision of power, water, security and roads, as well as the development of human resources in rural areas. Cellular operators, for example, could build extensions to the electricity grid to serve new base stations.

Policy should recognise alternative network providers and apply a favourable licensing regime to them when they operate in underserved areas. Community radio has now been entrenched in ICT regulatory regimes, and it is appropriate to offer similar regulatory provision for community networks.

Regulation

Regulatory frameworks have been used as a tool to expand access by introducing competitive provision of ICT infrastructure, but have not been successful in certain cases. Where regulation has been imposed on operators as part of their licence conditions, the operators have rolled out the infrastructure, but high costs have inhibited the consumer. Regulators need to review the tariff regime for cellular and internet provision to make the services affordable. Government has a range of tools to expand access, which include the following:

- *Establishing a licensing framework to ensure universal access.*
- *Establishing incentives such as cheaper frequency spectrum to induce cheaper tariffs in rural areas.*
- *Establishing universal service funds to support the expansion of services in rural and poor areas.*

- *Entrenching competition to ensure improved coverage and cheaper tariffs.*
- *Implementing an open access licensing regime to ensure that new players can enter the market and service niche areas. The open access approach allows community networks to thrive, riding on other operators' infrastructures.*
- *Monitoring costs of cellular telephony and internet which initially were not monitored.*
- *Legally recognising and supporting community networks.*
- *Eliminating tax on ICT equipment and other technologies like solar panels to make ICTs affordable.*

Operations

At the operational level, both the community and the operators have opportunities to support and intervene.

Communities need to appreciate that government is a facilitator, and that a community can and should take the initiative to try to shape ICT infrastructure so that it meets its needs. This is the framework that rural communities have used to build farmer cooperatives to sell their farm produce and handicrafts, secure supplies, and even build roads. The same framework can be used to build access networks to serve access needs. In doing this, the community should endeavour to create partnerships and contribute to the network (e.g., offering low-cost skills and security). Through this framework, it is feasible for the community to leverage government funding to build ICT infrastructure.

For their part, operators can intervene by working with equipment manufacturers to make technology cheaper, amongst other things.

5. Conclusions

Equitable access will continue to be a challenge. It is imperative that business models innovate by managing costs through choice of technologies and exploring multiple revenue streams, with an eye on affordable tariffs for the consumer. Efforts by the private sector in developing business models that are economically sustainable, entrepreneurial and community-owned are the way forward.

Likewise, policy and regulatory frameworks should continue to nurture and catalyse entrepreneurship and community ownership through the tools available to government, including the creative use of universal access funds. Key recommendations are:

- *Governments and other stakeholders (e.g., civil society and development partners) should create awareness amongst communities that they can play a*

role in securing their own ICT future, and that models exist that can support their quest for equitable access to ICT infrastructure.

- *Governments should recognise rural areas as special areas with particular ICT access challenges, and establish or strengthen rural development funds to support ICT infrastructure development.*
- *Universal access funds should, through various incentives, recognise, support and encourage the private sector and communities to create innovative business models to expand access to ICTs.*