Use of Telecommunications Services

Amongst Rural and Low-income Communities of Africa

- with Recommendations for Operating Companies

Figure 1 Exploring issues through focus groups

Introduction

One of the key issues in promoting access for telephony and internet in Africa is the need for information about how new services are likely to be used by consumers - both citizens and small businesses. Regulators, telecoms operating companies and ISPs all need to predict how quickly and extensively services are likely to develop if they are to establish viable access targets and network or service delivery schedules.

Whilst some companies conduct their own market research, regulators and others have limited resources and expertise with which to generate this type of information. The research aimed to help address the dearth of information by:

- identifying the patterns of use of telephony, particularly public access telephony, in low-income communities in three African countries;
- assessing the implications of these research findings for major stakeholders in the national ICT sectors studied;
- and presenting recommendations to governments, businesses and development agencies concerned with the promotion of access to telephony in similar low-income countries elsewhere in Africa and in other continents.

The research used a two stage field survey process which was guided by initial roundtables in each of three countries (Botswana, Ghana and Uganda) which provided opportunity for presentations on national telecommunications contexts and for discussion between stakeholders on their perceptions of the national market and their priority issues for research. The first stage of the field survey process comprised key informant interviews (with community leaders and local service providers) and focus group discussions with residents in communities representative of those to be researched. The questionnaires used for household interviews in the second stage were designed on the basis of this information.

The research was co-ordinated by Gamos Ltd, in partnership with the Commonwealth Telecommunications Organisation (CTO) and each of the three national telecommunications regulatory authorities – the Botswana Telecommunications Authority, the National Communications Authority of Ghana, and the Uganda Communications Commission. National academic institutions in each country managed field research activities and contributed extensively to research design and analysis - the Universities of Botswana, Legon (Ghana) and Makerere (Uganda).

This document presents a brief summary of the findings from the research, and the major recommendations relevant to development agencies. Also included is a brief synopsis of recommendations relevant to other stakeholder groups (policy makers and operating companies).

Further documents presenting detailed analyses and recommendations are available on the web site:

www.telAfrica.org

The Three Countries

The three research countries were chosen because, although all had experienced substantial restructuring of their telecommunications markets, they had undertaken restructuring in significantly different ways - in Botswana, through a single fixed network operator and competing mobile operators (two operators); in Ghana, through strategic external investment in the incumbent fixed operator and the introduction of new fixed and, more substantially, mobile networks; and in Uganda through the award of a second national operator licence to a company providing access through GSM wireless technology.

Botswana is a relatively high-income developing country in Southern Africa; it has a low population density with many communities dispersed in arid rural areas which pose substantial network roll-out problems for both fixed and mobile telecommunications operators. Ghana, in West Africa, and Uganda in East Africa are much poorer countries. Population density in Uganda is relatively high in most of the country, while some remote areas currently suffer from significant problems of insecurity. At 33%, teledensity in Botswana is an order of magnitude higher than in Ghana and Uganda – 3.5% and 2.3% respectively.

	Botswana	***Ghana***	***Uganda***
Population (millions)	1.7 (2001)	21 (2001)	23 (2001)
Per capita GDP (PPP$)	7,184 (2000)	1964 (2000)	1208 (2000)
teledensity	33% (2002)	3.7% (2002)	2.3% (2002)
Mobile phones per 100 inhabitants	24.2 (2002)	2.21 (2002)	2.01 (2002)
Fixed line phones per 100 inhabitants	9.1 (2002)	1.51 (2002)	0.26 (2002)
Payphones per 1,000 population	1.28 (2000)	0.16 (2000)	0.06 (2000)
Internet user per 100 population	0.74 (2000)	0.15 (2000)	0.18 (2000)

Table 1 Overview of available phones.
Source: CTO, except per capital GDP.

A sample of 520 to 630 respondents was surveyed in each of the three countries; samples were divided between three different geographic areas, covering urban and rural zones. Within each sampled area, rural and urban geographic survey clusters were selected to reflect a representative rural:urban population split of 70%:30%. Within each cluster, households were selected randomly. Although tailored to match the national telecommunications context, the questionnaires in all three countries comprised the same three sections:

- descriptors, *e.g.* age, gender, occupation etc.;
- market variables, to describe existing patterns of usage, e.g. frequency of use;
- attitudes and intentions regarding a range of issues.

Summary of Findings from data

Choices available to customers

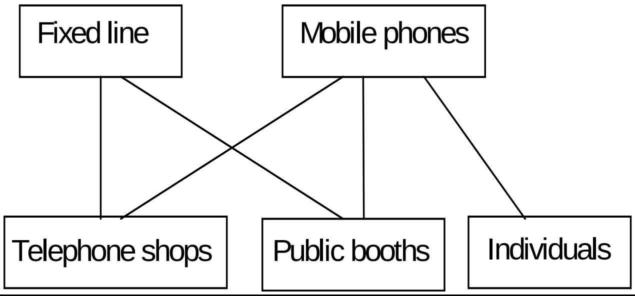

Figure 2 Types of phone, and means of public access

Customers generally have a choice not only of telephone technology to use (fixed line phones or mobile phones), but also of point of access. In most countries the points of access are restricted to public phone booths or commercial providers (private telephone shops), and this is especially true of rural areas. It was evident that a significant number of people in all countries have access to personal mobile phones at home (32% in Uganda, 37% in Botswana and 7% in Ghana). These choices are illustrated in Figure 2, where individuals includes home mobiles.

Use of Telecommunications Services

Findings showed that a surprisingly high proportion of respondents made ‘regular’ use of **telephony** (defined as use within the last three months). It is interesting to note that the proportion of respondents in remote rural areas who make regular use of services is only marginally smaller – 75% compared with 81%. This indicates that people are either prepared to make the effort (incurring costs and time) to travel in order to access services and/or take the opportunity to use the telephone when away from home. Individual country results show relatively little variation around these average figures, suggesting that these are likely to be robust across a range of national economic and telecommunications environments.

These figures hide the relative usage of **fixed** and **mobile** phones. Ghana has the highest usage of fixed line telephones, while Uganda has the highest usage of mobile telephones. This reflects both availability (e.g. the fixed network is the junior partner in telecommunications supply in Uganda) and affordability (e.g. more people can afford personal mobiles in relatively wealthy Botswana).

SMS use is lowest in Ghana, where fixed line telephony is dominant; it is interesting to note that although mobile use is highest in Uganda, the use of SMS is highest in Botswana, and this probably reflects a more sophisticated customer base. The principal use of SMS is for communicating with friends and family, followed by business use. Some people access SMS services using internet based services. Data confirms the value of SMS as a low cost means of communication; for example, most users in Ghana pay less than 25 cents to send a message, whilst the mode for fixed line calls is 44 cents (range 25 – 62 cents), and for mobile calls is 94 cents (range 62 – 125 cents).

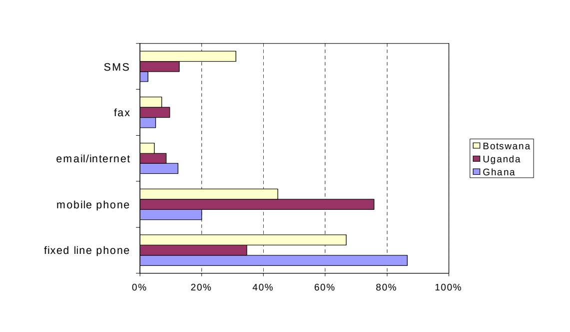

Figure 3 Use of telecommunications services (% of respondents)

Although an established technology, **fax** usage is low. Anecdotal evidence indicates that reliability is low, and there are few places that offer the service. Business use of fax is high, on a par with social matters, and there is a relatively broad spread of costs incurred in sending faxes.

In contrast to the widespread regular use of telephones, the research revealed low levels of **email and Internet** (browsing) use in all three countries, even in areas of high service coverage. On average across the three countries, less than 10% of respondents claimed to use email services or browse the Internet on a regular basis. Usage is highest in Ghana and lowest in Botswana.

Patterns of Use of Phones

Figure 4 Attendant at rural teleshop (Ghana)

In Botswana and Ghana, mobile users are a sub-set of fixed line phone users i.e. there are no (or few) respondents in areas with no service who use mobile phones exclusively. This is not the case in Uganda, where mobiles are the dominant service provider throughout much of the country.

With regard to **intensity of use**, results confirm that people in no access areas make relatively infrequent use of services, as would be expected. From an operator's point of view, it is interesting to note that a relatively high proportion of traffic can be generated by a small number of intensive users. Mobile phone users tend to be more intensive users than users of fixed line phones, especially in Botswana.

Regarding **time of day**, results show a roughly even spread of use throughout the day (from 6.00 to 8.00 in the morning to 22.00 at night). In areas of Ghana with no service coverage there is significantly lower use in the evenings, reflecting a reluctance to travel after dark.

The principal forms of **public access** available in the study countries are:

- public access facilities provided by the telecommunications operating companies (usually unattended, except in Uganda), described in the following as ***booths***;
- and access facilities provided by private entrepreneurs, either independently or through some kind of concession or franchising arrangement with a telco, described in the following as ***teleshops***.

The proportion of respondents using public access point in Ghana is only marginally lower than the proportion of respondents making regular use of phones, which indicates that almost all customers access services through public access points. This is not true in Botswana and Uganda, where there is a significant use of personal mobile phones – 39% or respondents use private mobiles in Botswana, and 28% in Uganda. These are the two countries where ownership of mobile phones appears to be highest – over 30%, compared with a figure of only 8% in Ghana.

Table 2 shows a distinct preference for commercial providers in Ghana and Uganda, and the differences are more marked in no access and rural areas. On the other hand it is booths that are the most common choice of public access point in Botswana, and again this is particularly so in no access areas. This indicates that there are different factors influencing the choice of access point, as is discussed below.

Data from Ghana and Uganda shows that fewer people in rural areas use public access points,

	Botswana	***Ghana***	***Uganda***
booths	66%	55%	46%
teleshops	45%	76%	63%*
private	39%	30%	28%**

Table 2 Regular use of public access points (whole sample)
* includes access through work, and friends and family
** home mobile phones only.

and this reflects the lower use of phone services in these areas. In Botswana and Ghana, there is a high reliance of people in no access areas on public access points; this is less so in Uganda where greater use is made of private phones.

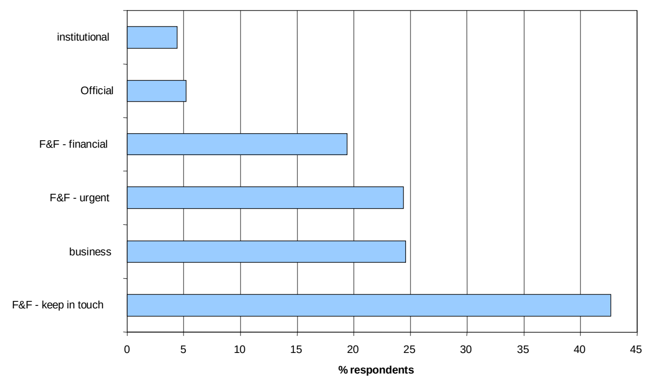

Figure 5 Purpose of calls (private providers, Uganda)

Attended service, available at teleshops, provides a number of useful features, including overcoming unfamiliarity with the technology, taking messages, and facilitating incoming calls. These features are of value in a new market, and for which customers are prepared to pay a premium. There is evidence that in an established market, the preference shifts towards booths, which offer the cheapest access to phones. The distinction between booths and teleshops is less clear in Uganda due to the policy of MTN to install booths under a franchise arrangement with a local attendant.

Other noteworthy means of access include a service offered by operators at local telephone exchanges in Ghana, which was clearly an important means of access for women.

Data was gathered from Ghana and Uganda on the **purpose of calls**, and although the specific categories used are different, they cover similar themes. The most common use of phones is for non-specific social calls – referred to as family wellbeing and “chatting” with friends and family. There are a number of aspects of communication with friends and family, such as urgent matters (e.g. funerals and festivals), financial matters (e.g. calling to family members working in cities to ask for money when school fees are due), and generally keeping in touch. Although efforts were made to identify the relative priorities of these issues, it is inevitable that all may come up at some point during a single conversation. Nevertheless, it is clear that fewer calls are made relating to business matters; figures indicate around half as many as to friends and family.

It is difficult to compare data on **distance of calls** between countries because of the variation in the use of mobile telephones and different distinctions between local and national (trunk) calls. However, it is worth noting the high proportion of national calls made in all cases, reflecting the importance attached by respondents to maintaining contact with urban relatives. This is more acute amongst users in areas with no access; in Botswana the proportion of trunk calls is higher amongst this group. Equally, it is notable that very few international calls are made in spite of high numbers of respondents having relatives abroad. The high cost of international calls presumably deters significant outgoing international traffic, but teleshop operators in Ghana also reported discontinuing international services after experiencing problems with billing.

Users that live in No Access Areas, and so travel to make use of telephone services, are – as would be expected – much more likely to make rather than receive calls. There is no reason, however, to assume that such callers would be less likely to receive calls than those in served areas if service were available to them locally, and this suggests that significant additional call revenue would be derived from traffic terminating in currently unserved areas once service becomes available.

For most groups, the **length of calls** received was longer than that of outgoing calls made; estimates indicate that incoming calls are over 20% longer. This is probably to be expected given the high proportion of calls exchanged between the surveyed (more rural) areas and major cities (where urban relatives may have higher disposable incomes). The ability to receive calls at public access points, was highly valued by respondents, indicating that a significant proportion of short calls may be made simply in order to arrange for a response call to be received.

Data from Ghana indicates that fixed lines are more convenient for **receiving calls** than mobiles. This may reflect the preference for accessing phones through teleshops (which tend to have fixed lines), which can facilitate incoming calls through messaging services

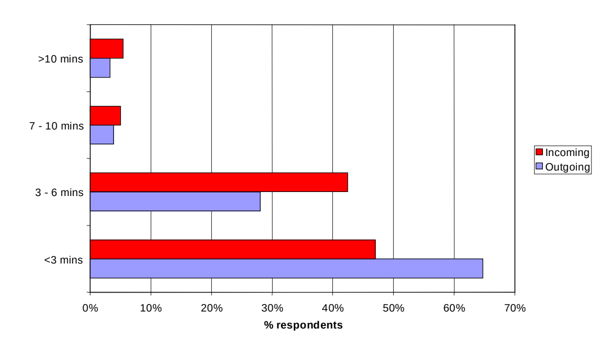

Figure 6 Duration of calls – private service providers (Uganda)

In Uganda, 'beeping' is a convenient way of initiating an incoming call; this also exists in other countries, known under a variety of names. 'Beeping' is the practice of dialling another user's phone number and letting it ring but hanging up before the call is answered, with the aim of prompting that person to call back. In Uganda, 38% of the total sample regularly beep, using public access points. The popularity of beeping is reflected in the "success rate" - the proportion of beeps returned to customers using both booths and telephone shops is similar, at 40%. The proportion of successful beeps made from personal mobile phones is slightly higher at 45%, but these people call back only 34% of people who beep them, confirming that people in rural and low – income areas are less willing to pay for a call.

Barriers and drivers - phones

One section of the questionnaires was dedicated to exploring attitudes and intentions regarding a range of issues identified as potentially influential onpeople's use of services. Analysis enabled the research to identify those issues acting as barriers (discouraging use of services) and as drivers (positive factors encouraging them to use services).

Among the most important **drivers** to use of telephony (fixed and mobile) cited in the three countries were:

- improved communications with friends and family abroad;
- ability to seek financial support from family members;
- speed and ease of communications.

Figure 7 Teleshop with private booths

Four main types of **barrier** to use were cited by respondents concerning public access facilities:

- the quality of the user environment (notably privacy and queueing);
- the quality of attendant service e.g. overcharging, refusing to allow incoming calls; attendants can, however, be regarded as positive e.g. providing user support, explaining charges;
- the quality of network service and call completion e.g. network breakdown, getting cut off;
- price and methods of payment e.g. paying higher charges for off-network calls, low denomination cards not available.

Email and internet

Analysis of email and internet use was constrained by the low numbers of respondents claiming to use these services. The principal **point of access** in all study countries was an internet café, followed by the workplace; workplace access was highest in Botswana (41%), reflecting the relative strength of the economy.

Level of education was, not surprisingly, a major factor influencing propensity to use email and Internet in all three countries. Those with secondary and/or post-secondary education were far more likely to use Internet than other educational tiers (83% of users in Botswana).

Educational content – and the belief that Internet access could boost educational achievement – were also significant factors cited by actual Internet users as **drivers** for Internet use, alongside contributions to business effectiveness.

The high cost of Internet access was cited as a major **barrier** to Internet use in all countries. This high cost is caused by two factors: a) the high per minute charge for access which is based on the per minute charge for a phone call (where dial-up connections are used); and b) the slow speed of Internet access, especially for browsing, which is due to restricted international bandwidth availability. It should be noted that slow browsing speeds also act as constraints on email use by public access (*i.e.* cyber-cafe) users who mostly use web-based email accounts.

Two other major **drivers/barriers** to Internet use were cited by respondents:

- knowledge of how to use services was a significant driver for those with the necessary skills but a substantial barrier to most users for whom the computer-based Internet required a considerably greater paradigm shift than access to telephony;
- power cuts were a significant barrier, in particular raising overall costs of Internet use and deterring file downloads.

An interesting finding with respect to Internet browsing is that respondents did not appear to consider the lack of local content to be a barrier. Most respondents said they used the Internet to keep abreast of current affairs and to pursue business and educational opportunities – they did not make a significant distinction between “local” or “non-local” Internet sites they browsed.

Booth Attendants – a mixed blessing?

Figure 8 booth with local attendant (Uganda)

Some interesting debates arose in Uganda with regard to the affect that booth attendants have on costs. During the course of one meeting, a man pointed to the hand painted sign in the street, and complained that although the sign advertised phone cards for sale, there were none to be bought. The attendant conceded that he was able to sell cards, but this was news to the villagers - they had only been able to pay for calls using his phone card. The reason lies in the profit margin that can be made from various means of payment. Attendants typically charge a 50% markup on calls made using a phone card, claiming this is line with guidance given by the operator. By contrast, if they have a coin operated booth their commission is only around 5% - 10% of the coins taken, and the commission on selling phone cards is similar. Card operated booths are often preferred, as they are less prone to problems with reliability and vandalism, and in these circumstances the attendant makes it easier to access the phone by overcoming the capital investment required to buy a card. So on the one hand, attendants promote phone use by providing customer service and reducing the amount of money needed, but on the other hand they can inflate the cost of calls by protecting their source of income.

Implications of Findings

Potential demand for services

The sections above focus on actual use of services as reported by respondents. One of the advantages of the methodology used for research analysis, however, is that it allows estimation of intended future use as compared with current use.

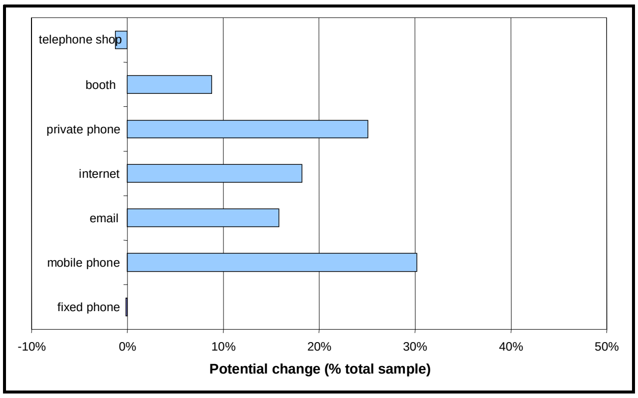

Figure 9 Potential change in use – Ghana (whole sample)

Figure 9 presents an example graphical representation of the potential increase (or decrease) in use of services and access points. Projected use is based on the number of respondents expressing a positive intention, and the potential change is calculated by subtracting the percentage of respondents currently using the service. Analysis shows the following trends:

- the potential growth in use of mobile phones. Figures from Botswana and Ghana indicate that whilst intention to use fixed line phones is roughly in line with current use, intention to use mobile phones is 20 – 30% higher than current use.
- This desire to use mobile phones is also evident in the intended choice of access points in all three countries; whilst potential changes in use of booths and telephone shops is modest, intention to use private phones (mobile, by implication) is 20 – 40% higher than current use.
- the trend in Ghana and Uganda is away from telephone shops, in preference of booths. This is in contrast to Botswana, where the trend appears to be in favour of telephone shops, at the expense of booths (note that negative attitudes for booths were strongly held, notably that they are often out of service).
- It is noteworthy that interest in the internet is higher than in email, even though current email use is higher.

Groups indicating a stronger increase in use of services were:
- those currently not using the corresponding ICTs;
- those with no or little formal education (in Ghana and Uganda, but not Botswana);
- those residing in No Access Areas,
- and those residing in Rural Areas.

Analysis suggests that there is least scope to increase use amongst those groups who are most likely to have already integrated the optimal level of telephone usage into their lifestyles:
- those with higher levels of education;
- those aged between 25 and 40.

Recommendations to Operators

Network

- Revise network expansion strategies based on higher assumptions about the revenue that can be derived from low-income markets. This evidence suggests that there is substantial unmet demand for telephony throughout low-income communities in Africa, and that individual citizens are prepared to spend significantly on telecommunications use, especially where it substitutes for travel.

- Improve network quality of service. Operators should pre-empt regulatory action to raise quality of service standards by initiating their own reviews of quality of service and taking action to improve network quality and call completion rates. Quality of service, particularly call failure, was cited as a barrier to use and may be a particular problem in rural areas, where networks may be less resilient.

Market stimulation

- Promotional / educational activities e.g. campaign or road show to promote the advantages of phones, explain how they work and how much they cost would increase use, particularly in rural areas and amongst people with low education, low ICT awareness and those that have never used phones. Such a campaign could be undertaken by individual telcos or in partnership by the industry as a whole, perhaps in conjunction with the national regulatory body. It should make full use of radio and other popular media. Price and other relevant information should also be widely advertised, especially at the point of use.

- Encourage high users of public access facilities to upgrade to personal phone ownership. Research could be carried out on the types of low user and other tariff packages targeted at people with low incomes that are available in other countries, and pilot projects conducted in particular areas. Those who own access, whether residential users or small businesses, will tend to use telephony more than those who rely on public access.

Marketing strategies

- Segment the 'small user' market and address different groups within that market in different ways. The research indicates that those groups which make most use of telephony at present, in particular those that are highly educated, are fully accustomed to telephony and are currently making near-optimal use of the service. Their current usage of the network is unlikely to increase unless and until network expansion extends the number of people with whom they choose to communicate by telephone and/or new services are made available that are attractive to them. Conversely, there are other groups within which potential demand is higher than current use e.g. those aged over 40 and those with low educational qualification levels. Telecommunications businesses should build on this research to identify the barriers to use of telephony among such groups, and devise strategies to overcome these barriers and so increase traffic revenues.

- Be prepared to meet high levels of demand in newly served areas. The research confirms previous experience that there is likely to be strong take-up of telephone usage in newly-served areas once network expansion takes place. As many as 70% to 80% of adults seem likely to make some 'regular' use of telephony.

- Provide information and support for new users not familiar with the technology. The research indicates that there are significant barriers to use for inexperienced users, who may be slow in becoming accustomed to use and may require support from intermediaries. When devising marketing strategies, operators should take the opportunity to encourage less confident potential users by more generic advertising, e.g. using local radio and other communications media to explain the potential uses, costs and ways of using telephony both at the time of network expansion and subsequently.

- Email and internet is likely to remain a niche market until cost and reliability can be improved. Activities might include internet exchange point (IXP) agreements, providing wholesale rates to ISPs enabling them to offer low cost Internet access, and backup and alternative power supplies.

Public access

- Ensure means of public access does not constrain use. Operators should carefully examine user preferences (e.g. operator-managed booths, franchising private entrepreneurs to provide teleshop access) when determining the most appropriate form of access provision and those facilities which most effectively meet consumer needs (and so maximise usage).

- Provide support to public access providers. It is likely that franchise arrangements will be more financially attractive to operators as operator managed facilities offer improved security and improved availability (managers will report take responsibility for getting faults repaired). Operators may find it financially beneficial to provide support to teleshop proprietors, for example through bulk discounts (provided these are passed on to end-users), micro-finance, business skills training, training in basic maintenance, *etc.* Revenue streams could be increased by providing additional facilities to end users e.g. wire transfers and remittances.

- Take account of consumer concerns when designing operator managed public access facilities. The research provides considerable evidence concerning user preferences, particularly the high value placed on privacy, ease of use, pricing options and support services offered by attendants. For example, queuing to use services can be addressed by installing more lines, privacy can be addressed through use of cubicles and soundproofing.

- Attended service overcomes barriers to use amongst users in newly-served areas. Where most users will be unaccustomed to telephony, it may be appropriate for booths to be supported by attendants who can assist new users, facilitate incoming calls, and report faults as they arise, ensuring rapid maintenance.

- Address concerns over pricing levels and methods of charging. Strategies should be devised to deal with a range of issues – amongst those identified through the research are:
    - the unavailability of low-denomination telephone cards;
    - the high mark-up charged by attendants for use of cards they made available (and the unwillingness of some attendants to sell cards) – diversify card distribution;
    - differential charging rates for calls to other networks – agreements between operators;
    - and any factors making the cost less transparent or predictable to the end-user – local advertising e.g. on community radio stations.

- Facilitate incoming calls to rural areas. Users noted the value to them of the opportunity to receive as well as to make calls through public access facilities. This opportunity is advantageous to both end-users (who save money) and telecoms operators (who generate reverse traffic). Where caller ID is incorporated in network technology, this can be done by 'beeping'. However, beeping is disadvantageous to teleshop proprietors as they lose their profit margin on outgoing calls. It may be possible for operators to share revenue generated from incoming calls with teleshops a as means of encouraging incoming calls.

Synopsis of Recommendations to other stakeholders:

Policy Makers

- Universal access strategies should be based on a thorough understanding of low-income markets.
- The substantial majority of adults in most African countries will make significant ('regular') use of telephony, policy makers should build their projections on this level of usage.
- Regulators should establish guidelines for determining those areas in which access cannot be provided on a commercial basis, to ensure that universal access funding is only provided in those areas where subsidy is genuinely needed.
- License arrangements should not constrain the means of access suited to remote areas e. g. take account of preference for access through private providers rather than through booths.
- Stimulation of competition between suppliers of public access; create a mix of public access points (booths, teleshops, individuals).
- Consider Preferential tariffs to compensate for the overheads that need to be charged on services from teleshops. Explore the introduction of a wider range of tariff packages designed to increase ownership.
- Minimise cost penalty for off network calls. Differential charging for termination of traffic on other operators' networks acts as a barrier to use.
- Regulators should monitor the performance of telecommunications network businesses in responding to user requirements and stimulating demand.
- Regulators should require network operators to undertake regular quality of service monitoring.
- consider undertaking further research studies of, for example:
- consumer responsiveness to different tariff strategies;
- individual customer expenditure patterns on communications;
- the impact of telephony access on postal services and on remittance transfers;
- and training requirements to promote effective use of email and internet.
- Assess the relative merits of prioritising network expansion for telephony, or Internet facilities.
- promote Internet access and use by considering a number of measures to help overcome barriers associated with high cost and unreliability:
- Improve quality and availability of power supplies e.g. through coordinated network development initiatives.

Development Agencies

- Development agencies need not be directly involved in investment in infrastructure. Levels of demand for basic voice telephony usage should be sufficient to attract private investment.
- Facilitate the sharing of experience between African policymakers and regulators - there is an increasing volume of regionally experience in the implementation of competitive markets and the establishment of universal access strategies in Africa.
- Specific support to address barriers identified e.g. promote network availability, promote local access methodologies (such as entrepreneurial teleshops), support the establishment of universal access schemes.
- Research into impact of ICTs on rural livelihoods, to help prioritise investment in basic services (such as voice telephony) and internet.
- Support coordinated infrastructure investment approaches bringing power and communications services together.
- Conduct further research into the impact of telephony access on mainstream development objectives including livelihoods and poverty reduction.

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