Antelope Consulting

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DFID Internet Costs Study

Appendix F: Country Case Study: Zambia

JOHN HUNTER, 21 JULY 2001

Executive Summary

Background

Zambia is just south of the equator and landlocked. Zambia gained its independence in 1964, and in 1991 one-party rule came to an end. The new government, which won again in 1996, is committed to liberalisation and privatisation. Forty percent of the 10 million population live in the "railway corridor" that runs from Livingstone in the south, through Lusaka in the centre, and up to the northern Copperbelt towns of Ndola and Kitwe. GNI per head is $330. The economy is dominated by copper mining. The copper mines that were nationalised in the late 1960s have been privatised. In the late 1980s and 1990s the economy was hit by falling copper prices and drought. The economy is recovering with the help of significant investment from South Africa.

Telecoms status

Being landlocked, international telecommunications links use satellite. Lack of access to international submarine cables may become serious, as the demand for international capacity increases. Zamtel (the incumbent) has been a candidate for privatisation since the early 1990s and the ongoing delay further complicates the relationship between new entrants and incumbent. The concentration of the population in the railway corridor improves the economics for telecommunication services.

The Communications Authority (CA) is responsible for regulation, while the Ministry sets policy. Criticism was expressed that the CA was too protective of Zamtel. The telecommunications market is said to be open to competition except for international voice, where Zamtel retains a monopoly. Further liberalisation is linked to the delayed privatisation of Zamtel. Zamtel is not currently offering any new retail or wholesale services to support ISPs. It is impossible to say whether or not Zamtel's ISP would be profitable on a standalone basis, as the accounting information is not available.

There are only about 80,000 exchange lines (0.9 per 100 inhabitants). Exchange line rentals are too cheap ($1.30 per month[1]); local calls are too cheap at 2 US cents/minute; national calls are too expensive (up to 63 US cents/minute); and international calls too expensive ($2 to $3 per minute).

There are two GSM mobile operators and Zamtel offers an obsolete analogue service. There are more mobile customers (90,000) than fixed network lines. Most mobiles are now pre-paid and call charges are about 40 US cents/minute. Both GSM operators are planning to become ISPs. A number of initiatives are taking place to try to improve telecommunications services in rural areas.

Internet status

An ISP licence costs $40,000 for five years plus 5% of revenue. ISPs are able to operate their own VSATs (providing international voice is not carried) and their own local access circuits. There are three ISPs, with in total about 10,000 customers. From the largest to the smallest in order of size: Zamnet developed from the University; CopperNet is a management buy-out from the copper mines; and Zamtel itself. A dial-up account costs between $20 and $30 per month, and direct access costs about $500 per month.

Each ISP uses satellite to access the Internet in the US, with the exception of Zamtel, which goes to Canada. International bandwidth is up to 2Mbit/s for each ISP. The cost of international bandwidth was not a consuming issue in the scheme of things. It was available and it worked. Two key indicators, cost per Mbit/s and kbit/s per customer, illustrate that international bandwidth is expensive and in short supply.

Internet costs

To illustrate the costs we considered the costs for typical dial-up subscribers and estimated the revenue and costs for an ISP.

For dial-up, we included the PC (a significant cost in Zambia at $1600 where a good salary is about $1,000 per month); exchange line rental (trivial); call charges (fairly trivial if local, but excessive if national); and ISP subscription charge (never more than 25% of the total).

For our ISP model, we estimated the dial-up revenue (83%) and direct connection revenue (17%). For the costs we included the one–off licence fee (a barrier to entry but relatively trivial over five years); international bandwidth (24% of the costs); staff (37% based on actual numbers and average salaries); and allowed one third for overheads. If the international bandwidth costs halved, the profit would double, or alternatively customers could get a faster service.

Projections

All three ISPs were confident of achieving growth; a factor of three in one year was predicted. Zamtel indicated that it would be offering international wholesale services, a very interesting development. The ISPs will face competition on three fronts:

- Zamtel wholesale services may make it easier for new entrants to get established, and these new entrants may be backed by international partners with access to technical, marketing and financial resources;
- The mobile operators (who are backed by international partners) will be offering WAP based services. The mobile operators have the advantage of a large appropriate customer base, an existing network, and although the service will be relatively slow so are the alternatives in Zambia. The availability of GSM/GPRS will provide faster data rates; and
- The final threat is Zamtel – the lack of appropriate services means that the ISPs have the additional cost and complication of infrastructure, and Zamtel could be cross-subsidising its ISP.

Conclusions

The Internet is much in evidence in Zambia. New industries such as growing roses and the export of vegetables rely on the Internet. E-mail addresses and web pages are included in publicity material. There are several Internet cafés.

But there is a *geographic divide* between the 40% of the population that live in the railway corridor and the remainder in rural areas; there is an *age divide* between Zambians that have benefited from the improvements in education and being educated in the computer age; and a *wealth divide* between the emerging middle class and the vast majority that are very poor.

To encourage the development of the Internet:

- It is important to demonstrate its value to decision makers;
- The position of Zamtel needs to be clarified;
- The cost for international bandwidth should be reduced;

- Practical assistance could be offered to the ISPs;
- More Internet cafés are needed in the cities to improve coverage, and also in the rural areas, although this is more problematic; and
- The possibility of cheap reliable terminals should be explored.

Contents

1 Background

1.1 Location

Zambia is landlocked in central Africa and lies between latitudes of 8 and 18 degrees south and longitudes 22 to 34 degrees east. Zambia is 2 hours ahead of GMT.

1.2 Political Situation

The Zambia gained its independence in 1964**.** Elections in 1991 brought an end to one-party rule, but the subsequent vote in 1996 saw "blatant harassment of opposition parties". In 1996 President Chiluba was re-elected with over 70% of the votes, and his party MMD (Movement for Multiparty Democracy) won 131 of the 150 seats. The government was elected on a platform of liberalisation and privatisation.

The new constitution limited the President to two five-year terms, and elections are due this year. After much debate the governing party has removed the two-term clause from its (MMD) constitution; President Chiluba is also head of the government. Given the tradition of African Presidents overstaying their welcome, this change in the constitution is of some concern. The President has since said that he will not go beyond the constitutional limit of two terms.

1.3 Population

The population is estimated to be just over 10 million. English is the official language and about 80% of the population over 15 years of age can read and write English.

About 40% of the population live relatively close to the railway line from South Africa that enters Zambia from Zimbabwe at Livingstone, the location of the Victoria Falls. The line travels about 500 km northeast to Lusaka the capital. From Lusaka the journey continues north passing Kapiri Mposhi, the Zambian end of the narrow gauge line to Dar es Salaam.

Ndola is about 350 km north of Lusaka. Because of the concentration of copper mines, this area is referred to as the Copperbelt. Other towns in the Copperbelt include Kitwe, Luanshya, Chingola, Mufulira and Kalulushi.

Lusaka has a population approaching 1 million, and Ndola and Kitwe are about half the size. A further 10% live in towns remote from the railway line, with the remaining 50% living in rural areas.

1.4 Economy

In the 1980s and 1990s, declining copper prices and a prolonged drought hurt the economy. The Zambian Kwacha now trades at about 3000 to the US$. This is a serious decline from near parity in the late 1960s, and 864 to the US$ in 1995.

Despite the new Government's progress in privatisation and budgetary reform, Zambia's economy has a long way to go. Inflation and unemployment rates remain high. The recent privatisation of the huge government-owned Zambia Consolidated Copper Mines (ZCCM) should greatly improve Zambia's prospects for international debt relief, as the government will no longer have to cover the mammoth losses generated by that sector. Zamtel, the incumbent telephone company, has still to be privatised.

Natural resources in Zambia include copper, cobalt, zinc, lead, coal, emeralds, gold, silver, uranium, and hydropower (where Zambia is a net exporter of about 1 billion kWh (1998)). The economy is dominated by the copper mines, which account for about 80% of export earnings, produced by less than 10% of the workforce. The government is attempting to encourage agriculture. Zambia now supplies vegetables to supermarkets in Europe, and exports over 12 million roses a year.

South Africa has now replaced the UK as the largest investor in Zambia and has made major investments in hotels, supermarkets and shopping centres. The shops sell primarily goods from South Africa. It is said that Zambia is being re-colonised by South Africa.

Population	**10.5 million**
Population below 14 years	**48%**
Area	**753 000 sq km**
Neighbours	**Angola, Republic of the Congo, Malawi, Mozambique, Namibia, Tanzania, Zimbabwe.**
Life expectancy	**37 years**
Literacy	**80%**
Government	**Republic, multi-party**
GNI / capita	**$330**
Exchange rate: PPP	**0.46**
GDP structure	**Agriculture 21 %, industry 31 %, services 48 %**
State budget	**Revenue $606 million (1999), expenditure $547 million (1998 est.)**
Economic aid	**$1.99 billion (1995)**

Table 1: Country Indicators for Zambia

1.5 Telecommunications

The location, political situation, population, and the economy all impact the development of telecommunications.

Being landlocked nearly all of Zambia's international traffic is via satellite. Zamtel has two satellite earth stations, pointing at Intelsat Indian Ocean and Atlantic Ocean. Other countries in the region that have a shoreline will gain the advantage of having access to high capacity, high quality and relatively cheap fibre submarine cables. This may create a geographic divide. Access to the shoreline could be gained alongside the oil pipeline or the railway line to Tanzania.

The political situation may delay the privatisation of Zamtel. The relationship between new entrants and the incumbent is always fraught with difficulties, largely because the incumbent is both a supplier and competitor. This difficult situation is made much worse as neither the new entrants nor Zamtel have a clear understanding of what the future holds for Zamtel.

The concentration of the 40% of the population along the railway corridor, and in the towns of the Copperbelt improves the economics for both fixed and cellular networks. Facilities are said to be among the best in Sub-Saharan Africa, with high-capacity microwave between towns and cities, and the problems tend to be in the local loop. This area is also home for an increasing number of professionally qualified Zambians, earning more

than $1,000 a month. The 90,000 mobile phones have coverage only in this area, illustrating Zambia's digital divide.

The agricultural developments need good telecommunications as they are serving world markets. This need, coupled with tourism, should help to extend service to rural areas.

Main Telephone Lines	**83,100**
Main Lines per 100 inhabitants	**0.9**
Waiting List	**25,000 (1997)**
Payphones	**513 (1997)**
International outgoing minutes	**13 million (1997)**
International incoming minutes	**17 million (1997)**
Zamtel – staff	**3,260 (1997)**
Zamtel – lines per staff	**24 (1997)**
Mobile connections	**90,000**
Mobiles per 100 inhabitants	**1**
ISPs	**3**
Internet Hosts	**892**
Internet Users per 100 inhabitants	**0.14**
TV per 100 inhabitants	**8 (1997)**
Personal Computers per 100 inhabitants	**0.6**

Table 2: Telecommunications Indicators[2,3]

2 Telecoms status

2.1 Legal and regulatory framework for both ISPs and telecoms

The 1994 Telecommunications Act established the Communications Authority (CA) as an independent Regulator. At the CA a meeting was held with:

- Susan Mulikita Licensing and Consumer Affairs a lawyer
- Kephas Masiye Senior Radio Officer ex Zamtel

A meeting was also held at the Ministry of Communications and Transport with the Deputy Permanent Secretary, Mr E M B Chileshe.

The CA is a separate legal entity, which awards licences, checks for compliance and has enforcement and revocation powers. The CA can sue, and be sued. The Ministry decides policy, and can direct CA in certain cases. According to the CA, the Ministry is likely to adopt CA recommendations.

Currently there are 36 staff at the CA. It is understood that, particularly in the frequency management sections, a number of staff transferred from Zamtel.

Neither the CA nor the Ministry had any detailed knowledge of WTO or GATS commitments.

The CA is not without its critics. The Commonwealth Parliamentary Association (CPA) funded Derek Wyatt, a UK Labour MP. To quote Wyatt[4] "the CPA offered a number of scholarships to UK MPs to travel overseas to study specific topics. I chose as my special subject the Digital Divide (D2D). I selected Mozambique, Tanzania and Zambia as places to visit." According to Wyatt "The Regulator had to raise his own money for the administration costs and was therefore in a Catch 22 situation. He couldn't pay his staff and therefore couldn't regulate without charging out his services by way of a series of taxes on this embryonic industry. Until this was resolved there would be little chance of introducing sound government policy."

New entrants are of the opinion that the CA appears to be there to protect Zamtel and is too close to the Ministry. The situation is not helped as the Minister keeps changing, causing policy confusion.

2.2 Progress towards liberalisation

The telecommunications market is said to be open to competition, with the key exception of international voice. International simple voice resale (ISVR) is not permitted, and International Call Back is not allowed. The reality is that there are no competitive PSTN services, although there are three mobile operators, and three main ISPs. Mobile operators must pass international calls to Zamtel, and ISPs must not provide international voice services. ISPs can use their own satellite services for international Internet access.

Zambia is landlocked and most international calls are routed by satellite. Interest has been expressed in installing fibre, to link to international sub-sea cables. Fibre could reduce the price and improve the quality of international communications, but third parties are unlikely to be willing to invest until international voice communication is open to competition.

Liberalisation is closely linked to privatisation. The Zambian Government has been committed to privatising Zamtel since the mid 1990s. Many industries, including, most significantly, the mines (which account for about 80% of Zambia's income), have now been privatised. The pros and cons of privatisation are much debated in the press, but there is no mention of Zamtel.

The CA is attempting to influence privatisation on issues such as the retention of Zamtel's monopoly for a period of time afterwards, as in South Africa. The view was expressed that there was no political will to deal with Zamtel. The Ministry said that the issues were being dealt with at the highest level, including the current commitment to sell just 20%. The Ministry thought that there could be an announcement within a few months.

It is also not clear who would invest in Zamtel. Interestingly Orascom (owner of Telcel, one of the mobile operators) has a stake in the incumbent telephone company in Uganda. It was suggested was that the purchase could be funded locally.

There is general agreement that action is urgently required for several reasons. These include the current lack of investment in Zamtel, and the need to clarify the position for new entrants. The view was expressed that Zamtel's market position will be eroded by technology and the company could drop rapidly in value.

2.3 Fixed network: industry structure and players, market size and growth

2.3.1 Zamtel

Contact was made with Mr Ngosa, Director of Planning and Development at Zamtel.

The number of lines, at only about 80,000, has been static for many years. Zamtel has many problems including, for example, too many staff; the Government has not paid its telephone bill for many years; and there is little incentive to improve.

Zamtel is not currently providing new services to support ISPs. For example ISPs have to establish their own points of presence, rather than rely on Zamtel to provide a national retail Internet access tariff, such as the 0845 service in the UK.

There is little evidence that Zamtel is offering attractive wholesale services. Both mobile operators are building their own national networks, partly because the prices quoted by Zamtel were too high. Similarly ISPs are bypassing the Zamtel international gateway, although it is understood that Zamtel is planning to offer wholesale Internet access.

The figures are not available, but uneconomic bypass is likely. That is, at Zamtel's current inflated prices new entrants can build their own facilities more cheaply. If Zamtel charged at cost, plus a reasonable rate of return, it would be more cost effective for new entrants to use Zamtel than build their own. If this were to happen, then Zamtel would benefit and the new entrants would be able to focus on their core business, for example by increasing capacity and coverage for mobile.

2.3.2 Regulation of Zamtel

Zamtel offers an analogue cellular service and is an ISP. These services are provided under the same licence conditions as its competitors, not under its main licence.

Zamtel poses a threat to new entrants because, without proper accounting information, Zamtel could cross-subsidise its mobile and ISP businesses and drive the new entrants out of business. At present no separate accounts exist for these two services. The CA has requested these, but it is very unlikely that the information will be available in the short term.

2.3.3 Zamtel tariffs

The one-off connection charge for an exchange line is about $20 and the rental about $1.30 per month. Calls are charged using periodic pulse metering and cost from about $0.02 per minute for a local call up to $0.63 per minute for the most expensive national call.

The cost to call a mobile is about $0.40 per minute, a relatively recent increase from $0.10 per minute. Zamtel increased the charge in an attempt to reduce its outgoings, but payments have continued to increase.

International calls are quoted in US $, and range from $1.70 per minute to nearby African countries, $2.30 to the UK, and $2.80 to South America.

	Lines	Lines per 100 inhabitants	Connection ($)	Rental ($/month)
Zamtel	83,100	0.9	20	1.30

Table 3: Summary of Zamtel fixed telephone lines

	Call Charges		National		International			Call Mobile
	Minimum Charge ($)	Local ($/min)	Shortest ($/min)	Longest ($/min)	Adjacent ($/min)	UK ($/min)	Most Expensive ($/min)	($/min)
Zamtel	0.06	0.02	0.13	0.63	1.70	2.30	2.80	0.40

Table 4: Zamtel call charges

2.4 Mobile network: industry structure and players, market size and growth

2.4.1 Mobile operators

There are three mobile operators each with fairly limited coverage:

Celtel, 80% owned by MSI who have stakes in several mobile companies in Africa (CDC, previously known as the Commonwealth Development Commission, has a stake in MSI), GSM, and has about 50,000 customers.

Telcel, owned by Orascom Telecom of Egypt (CDC also has a local stake), GSM (previously offered a CDMA service), and has about 30,000 customers.

Zamtel, owned 100% by Zamtel, analogue, less than 10,000 customers – it is understood that Zamtel is in China attempting to raise funding for GSM.

In total there are about 90,000 mobile customers – more than the number of fixed lines. Pre-paid tariffs (credit validation hardly exists in Zambia) have boosted the numbers. 99% of Telcel customers are pre-paid. As well as business people, taxi drivers and market traders have mobiles.

Mobile Operator	Subscribers
Celtel	50,000
Telcel	30,000
Zamtel	10,000
Total	90,000

Table 5: Summary of mobile operators

2.4.2 Regulation

A significant issue is the inability to carry international calls. Telcel installed their own satellite dish in the belief that they could carry their own international calls. The problem is compounded, as international roaming is not available in Zambia because of signalling issues at the Zamtel international gateway.

Telcel is also unhappy at the interconnect agreement with Zamtel who are unable to carry out interconnect billing. Telcel also point out that the GSM frequencies have been allocated incorrectly. Some of these disputes may end up in court. (A meeting was held with Clive Shanwana, Commercial Director).

Both Celtel and Telcel are in the process of becoming ISPs.

2.4.3 Tariffs

Pre-paid mobiles cost about $150.

Relative to calls from Zamtel's fixed network, national calls from mobile are expensive. For example:

Telcel to fixed call cost about $0.40 per minute;

Telcel to Telcel calls are slightly cheaper at $0.35 per minute and only $0.13 per minute off-peak;

Telcel to Celtel calls are more expensive at $0.60 per minute.

Telcel international calls are 10% cheaper than from Zamtel's fixed network. Celtel's charges are similar.

	$	$/min
Pre-paid mobile	150	
Call Charges		
Local		0.40
National		0.40
On-Net		0.35
Off-Net		0.60
International		as Zamtel

Table 6: Pre paid mobile: Typical charges

2.5 Regional differences and availability of infrastructure in rural areas

The Ministry is very much of the view that only Zamtel can afford to support rural areas; the indications are that Zamtel is not doing this very well at present. This view was supported by pointing out that the mobile operators only provided service in the main areas of population – but their licences contain no coverage requirements! However there are a number of initiatives worth noting.

CA indicate that it is planning to use part of its income to set up a development fund that may be used to aid development in rural areas – but the indications are that it is having trouble funding its own activities.

The Ministry mentioned that the South African Minister for Telecommunications has held a meeting to encourage the provision of rural telecommunications services in other southern African countries. The theme was to consider the combined requirements for different sectors, for example health, employment, and education. The Zambian Ministry and the other countries involved are preparing papers to be presented at a follow up meeting.

The British Council has also been active (a meeting was held with Brendan McSharry, the Director). Following on from Derek Wyatt's visit, the British Council held a "Zambia E Think Tank" meeting in March 2001. All the main players were invited (mobile, ISPs, CA, Zamtel, university) but the CA did not attend. The main conclusions from the meeting were as follows.

- The regulatory burden is inhibiting investment in infrastructure by new entrants such as the mobile operators;
- The environment would be more conducive to investment once Zamtel and Zamnet (see 3, Internet status) had been privatised;

- Government should be encouraged to use ICT;

- An ICT action group should be established with representatives from the private sector, civil society, Zamtel, CA and the ministries of Information and Broadcasting; Commerce & Trade; Communications and Transport, Science, Technology, & Vocational Training; and Education. The action group should be Zambian, and be chaired in rotation;

- The Group would be an agent for change with the objectives of reducing public ICT costs, opening up competition, achieving critical mass in investments, and increasing Internet cafés and Telecentres.

The British Council, as part of its Knowledge Centre, offers Internet access to its members for about $3 an hour. Membership ranges from $133 per year for a corporate, down to $7 for three months.

CopperNET is planning to provide a number of rural TeleCentres with support funding from IICD in Holland. Oneworld is also linked to this project. Oneworld, partly funded by DfID, was founded by BBC journalist Peter Armstrong to increase African content on the Internet (only 1.1% of Internet content is African).

3 Internet status

At present there are three main ISPs in Zambia: CopperNET, Zamnet, and Zamtel. About another six are licensed, but are not yet operational. Two mobile operators are both planning to become ISPs.

3.1 Legal and regulatory framework

The licensing procedure is as follows. An application form needs to be purchased for a fee of about $4. The form asks for fairly detailed information including particulars of applicant, ownership, company details, shareholders/directors, employees in first year, auditors, bankers, financial summary, network plan. In addition a business plan is required. The same form is used for other telecommunications licences.

There is a charge of about $20 for evaluation, which should be completed within two months. An ISP licence may not be awarded "in circumstances where the applicant has not fulfilled Zambian legal requirements such as normal company procedures, investment laws (if foreign), telecommunication laws and other pre-conditions laid down by the Authority such as production of business plan including roll-out plan, proof of source of funding, to mention only some of the requirements".

There appears to be plenty of scope for delay – with comments along the following lines – "you need funding in place before a licence is awarded, but you cannot raise the cash until after the licence is awarded"!

On the award of a licence, a fee of $40,000 is charged to cover the five-year life span of the licence. In addition there is a levy of 5% of revenue.

ISPs can bypass Zamtel's international gateway providing voice is not carried. Liberalisation of international voice would be very attractive to the ISPs, as international calls cost in excess of $2 per minute. The ISP would have to apply for a separate radio (as opposed to telecommunication) licence for the VSAT. Similarly a radio licence would be required for any microwave links.

The same licensing procedure as described above applies to Internet cafés, including the need for a business plan. The fee for the licence is $47,000 for a period of 5 years. This approach looks inappropriate.

3.2 Industry structure and players

The three main players have very different backgrounds:

Zamnet: said to be the first ISP in Africa, grew from the University of Zambia;

CopperNET: a management buy out of an ICT group from the Copper Mines;

Zamtel On Line: a division of Zamtel, the incumbent telephone company.

For each of the ISPs a brief overview is provided.

3.3 Zamnet (http://www.zamnet.zm)

A meeting was held with Daniel Mpolokoso, Managing Director.

Zamnet claims to be the first ISP in Africa and was launched in 1994 as a University of Zambia initiative. It is the largest ISP in Zambia. The ownership has proved to be problematic and not appropriate for securing additional finance.

3.3.1 Tariffs

Dial-up customers are charged as follows:

$10 one off connection fee

$25 monthly rental for up to 60 hours

$3 per hour for any additional time

Direct access is charged per month at:

$500 for 32 kbit/s

$750 for 64 kbit/s

$1,000 for 128 kbit/s

3.4 CopperNET (http://www.coppernet.zm/)

A meeting was held with Thomas Lunga General Manager (South).

CopperNET is the result of a management buy-out, when the copper mines were privatised, a few years ago. For Zambia to be successful economically, the mines must prosper. The mines require good IT and communications services. Being the traditional provider of these services puts CopperNET in a strong position when negotiating with the Government, which wants to be seen helping the mines.

CopperNET have been able to retain the mines' interconnect agreement with Zamtel. This connects a large private network, which originally served the mines in the Copperbelt, to Zamtel. More recently CopperNET has invested in its own national transmission links, and also plans to lease capacity from the two cellular operators.

CopperNET wants to become a telephone company that is also an ISP. They provide VPNs and LANs, develop applications, and offer training. Telephony is seen as the growth area; the Zamtel service is poor and expensive.

3.4.1 User Base

CopperNET believes that there is demand in the rural areas. Government Agencies and commercial organisations have not been able to operate efficiently in these areas because of inaccessibility by road and telephone. Commercial examples quoted by CopperNET include wealthy farmers, and Zambia Sugar. Owners of a game lodge are spending over $20 a day on satellite calls to the Internet but are receiving bookings at $280 per day. Access is the prime requirement. Zambia is a major exporter of vegetables to supermarkets, and for this all transactions take place over the Internet. Consumers want to keep in touch with friends and family that have moved to the cities or abroad. E-mail has many advantages over shared access to a telephone.

CopperNET believes that it can make the provision of services to rural areas profitable. The plan is to franchise Internet Cafés in rural areas. The franchisee would offer e-mail, web access and a range of business services. The proposal is to charge at about $7 per hour for access.

In addition, the franchisee would re-sell CopperNET services, earning commission, and improving the economies of scale for CopperNET. CopperNET have received funding from IICD in Holland

(http://www.iicd.org/countries/) to support this approach (http://www.elink.com.zm/comm_telecenters.htm).

In a similar vein, they quoted the example of a rose grower that needs and is willing to pay for radio access. CopperNET propose to develop a cell system based on his farm to extend the service to others nearby.

3.4.2 Tariffs

Dial-up customers are charged as follows:

Zamtel normal voice rates – periodic pulse metering makes short call failures expensive;

Cellular – plans are in place to provide access at $0.40 per minute, slow but available and reliable;

A lodge owner who is about 1 hour from Lusaka currently has to drive to Lusaka about twice a week to pick up e-mails, as the Fixed Radio Access telephone service provided by Zamtel cannot support Internet access. He is contemplating Cellular access, as $0.40 per minute is cheap, when you are getting bookings at $180 per day.

Other charges include:

$29.50 installation fee plus VAT;

$30 per month for e-mail and web access;

$10 per month for e-mail only.

Direct access by DSL is charged per month at:

$450 for 32 kbit/s;

$800 for 64 kbit/s.

3.5 Zamtel Online (http://www.zamtel.zm/zamtel/ztelInternet.html)

A meeting was held with Bwalya Kesenge, Senior Engineer at Zamtel Online.

The service was launched in May 1997 and had a reputation for being poor quality, slow and congested. Recently Zamtel has made considerable investment and now believes that the service being offered is the best in the region. However they did not appear to be particularly

well organised the meeting was interrupted repeatedly with customer services issues.

All web pages are held locally and the most popular site is Yahoo. Kesenge sees the high cost of PCs as a major impediment to growth.

A significant development is that Zamtel is planning to provide a cheap and reliable wholesale service to other ISPs. They are also planning to extend coverage to rural areas.

3.5.1 Tariffs

Dial-up customers are charged as follows:

$9.50 one off connection fee;

$19 monthly rental for up to 50 hours;

$2.50 per hour for any additional time.

Direct access is charged per month at:

$350 for 64 kbit/s;

$695 for 128 kbit/s;

$10,355 for 2 Mbit/s.

	Full Access			
	Connection ($)	**Rental ($/month)**	**Hours included**	**Additional ($/hour)**
Zamnet	10	25	60	3
Copper Net	n/a	30		n/a
Zamtel	9.50	19	50	2.50

Table 7: Summary of ISP dial-up tariffs

	32kbit/s	**64kbit/s**	**128kbit/s**	**2 Mbit/s**
	($/month)	**($/month)**	**($/month)**	**($/month)**
Zamnet	500	750	1000	n/a
Copper Net	n/a	450	800	n/a
Zamtel	n/a	350	695	10,355

Table 8: Summary of ISP direct connection tariffs

4 Internet costs

To put the cost for international bandwidth in context, first we estimated the total monthly cost for typical dial-up customers. This illustrated the relative magnitude of the ISP charges. We also developed a simple revenue and cost projection for an ISP and showed the relative magnitude of the international capacity (see Annex).

4.1 Dial-up customers

A dial-up customer needs to have a PC, and this costs about $1,600 or $67 per month over two years. The PC may be used for other functions, so allocating the total against Internet use may be unfair.

Exchange line rental at $1.30 per month is trivial; the minimum taxi fare is about $3. The low line rental is partly due to the need to rebalance, but is also caused by the devaluation of the Zambia Kwacha.

We considered local access and a medium priced national call. The cost for local call access is trivial at 2 US cents/minute. The national calls are significantly more expensive. This increase is in spite of Zambia having relatively cheap long distance microwave links in the railway corridor.

We used $25 per month for the ISP charge. For local call access, at 60 minutes per day the local call charge matches the ISP charge. For national call access, even at 5 minutes per day, the call charges are more than the ISP charge.

The $25 per month ISP charge looks reasonable given the other charges.

Cost projections for typical users								
User profile	**Local 5 mins per day**	**National 5 mins per day**	**Local 5 hours per month**	**National 5 hours per month**	**Local 10 hours per month**	**National 10 hours per month**	**Local 20 hours per month**	**National 20 hours per month**
PC - Purchase	1,619							
Per month ($)	67	67	67	67	67	67	67	67
Rental								
Per month ($)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Call Charges	**Local**	**National**	**Local**	**National**	**Local**	**National**	**Local**	**National**
Minutes per day	5	5	15	15	30	30	60	60
Days per month	20	20	20	20	20	20	20	20
Hours per month	1.7	1.7	5.0	5.0	10.0	10.0	20.0	20.0
$/min	0.02	0.38	0.02	0.38	0.02	0.38	0.02	0.38
Per month ($)	2	38	6	114	13	228	25	456
ISP								
Fixed (per month $)	25	25	25	25	25	25	25	25
Variable								
Total	**96**	**132**	**100**	**208**	**106**	**322**	**119**	**550**
Notes	PC and exchange line rental all allocated to Internet access Exchange line connection charge ($20) not included Longest national call is about twice as expensive as the one quoted Not normally required due to local POP							

Table 9: Cost projections for typical users

5 Projections

The three ISPs were confident about achieving growth in the future, but details were often confidential.

Zamnet had recently established a point of presence in Livingstone. With the Victoria Falls and related tourism, Livingstone is experiencing considerable investment from South Africa. Tourism in Livingstone is also benefiting from the deteriorating security situation in Zimbabwe. Zamnet is in the process of raising money to finance its development and in the short term is focussing on improving its quality of service.

CopperNet has expanded from its traditional base, which is serving the needs of the mines in the CopperBelt. It has relatively recently opened an office in Lusaka. CopperNet is anticipating that its turnover will increase by a factor of three next year. Again reflecting its background, CopperNet is not just an ISP but intends to grow by providing a range of IT and telecommunications services to its business clients. Also, as explained, CopperNet is convinced that it can provide Internet access and related services profitably in the rural areas.

Zamtel is also predicting growth by a factor of three. Of significant interest are Zamtel's plans to provide wholesale international services. Zamtel, with its large capacity earth stations, should be able to provide these more cheaply than ISPs building their own international VSAT networks. This could be attractive to the other two ISPs, but could also pose a threat as it could ease market entry for new ISPs. Unlike the existing ISPs, international Internet companies might own these new ISPs, providing access to technical, marketing and financial resources.

Both the GSM operators are also planning to become ISPs. Internet WAP mobile phones have not been a success in Europe partly because of the limited data rates, small screens, and the availability of other more convenient methods to access the Internet. In Zambia WAP mobiles could be much more successful. A PC would not be required, coverage should be available in the railway corridor, and although the data rate would be slow, it should be reliable. Data rates will improve with the launch of GPRS.

The GSM operators also have a number of advantages over the existing ISPs. They are building a national network to link their base stations, and are planning international satellite links. These can also carry Internet traffic at marginal costs. Importantly they already have an appropriate

customer base of 90,000 and most Internet users also have a mobile. Their international parents can provide technical, marketing and financial resources. The traditional ISPs will need to take proper account of the potential growth of mobile Internet.

Zamtel poses a dual threat to the growth of the ISPs. Firstly, by not offering the appropriate wholesale services, Zamtel has driven the ISPs to make significant investments in infrastructure, rather than focussing on their core ISP business. And secondly, because the difficulties of detecting cross subsidies could allow Zamtel to undercut the ISPs.

6 Conclusions

6.1 Build on success

In many respects Zambia has a relatively healthy Internet environment. There are three active ISPs, each with quite different backgrounds appealing to different market sectors. Other ISPs plan to offer services, including both GSM mobile operators. New industries such as rose growing and the supply of vegetables to supermarkets in Europe rely on the Internet. In the main cities there are Internet cafes, and employees are permitted to send and receive personal emails at work. Email addresses are very evident on publicity material. Many organisations have web pages including newspapers, tourism, business directories, and the Government.

But there is a geographic divide between the 40% of the population that live close to the railway corridor, the 10% that live in rural towns, and the remaining 50%, many living in remote rural areas. There is an age divide between those that have benefited from the improvements in education and being educated in the computer age. And finally there is a wealth divide between traditional wealthy (ministers, senior civil servants), the expanding educated middle class (typified by the employees of ISPs and mobile companies), and the vast majority that are very, very poor. These divides are also evident in the UK, but are much more extreme in Zambia.

A number of initiatives could be taken to improve the situation. The initiatives focus on practical assistance rather than on project funding. The success of the Internet depends on market forces. Zambia is littered with projects that had funding for say 3 years, and once the aid was removed the project died on its feet. VSAT links should not become the 2001 equivalent of land rovers rusting unused in the fields. Money could be more usefully spent on awareness and training. There are people with money in Zambia who could raise the finance for viable Internet projects. A new school has just been built with private Zambian funding.

6.2 Demonstrate the importance of the Internet to decision makers

The young and well educated in the population are already convinced; the problem tends to lie with older and poorer educated people that may control the finances, for example in Government. Practical examples should be used to illustrate how people can work smarter, and that the savings swamp the Internet costs - a safari company is using a satellite

phone for e-mail and spending more than $20 a day, but is getting bookings at $280 a day per person. Identification of the roadblocks (including the cost of computers, the need to reform Zamtel and the related regulation), and the benefits to the economy that would follow, would give decision makers a more informed impact on policy. The initiative taken by the British Council should help in this direction.

6.3 The reform of Zamtel

Other privatisations in Zambia, and there have been many, have tended to use a trade sale approach rather than a share floatation. The election in Zambia, and the current problems of the world telecommunications sector may further delay the privatisation of Zamtel, which has been mooted since the mid 1990s.

The hope is that privatisation will clarify the relationship between ISPs, other new entrants, and Zamtel. The relationship with the incumbent is always fraught with difficulties, largely because the incumbent is both a supplier and competitor. This difficult situation is worse in Zambia as neither the new entrants nor Zamtel appear to have a clear understanding of what the future holds for Zamtel.

What is frustrating is that the interests of the ISPs and Zamtel, in many cases, are not in conflict. If Zamtel were to provide appropriate retail services (for example increased coverage and quantity of exchange lines, and internet access call charge rates available nationally); and appropriate wholesale services (for example national and international transmission capacity at cost plus rates to eliminate un-economic bypass); then the ISPs could focus on their Internet business and not need to attempt to encroach on Zamtel's core business. Licence conditions could be drawn up to ensure that ISPs, other new entrants, and Zamtel have the appropriate balance between their rights and obligations.

But time is short – new technology such as very low cost VSAT access may erode Zamtel's profitable international voice monopoly. The CA could attempt to license this VSAT service, but could be overwhelmed by the numbers, and would be restricting a service with significant benefits to the Zambian economy. Based on developments in North and South America, it should be reasonable to expect within the next year a service offered direct to end users on the following lines:

- Terminals $700-$900;
- Access $30 - $50 per month;

- Up link 56kbit/s, down link 200-400 kbit/s

Liberalisation and privatisation are major issues. Getting them right will have a major impact not just on the telecommunications sector, but also on the economic development of Zambia.

6.4 International bandwidth

The high cost per Mbit/s, the low value for the kbit/s per customer, and the slow response times illustrate the high cost and the lack of international bandwidth. It is believed that this problem could be sorted if Zamtel offered cost based access to its international satellite capacity. There is some indication that Zamtel will start offering such a service. ISPs could use Zamtel, and would be in a better position to bargain with other suppliers. Any action taken internationally to reduce the cost of international transmission capacity would be of direct benefit.

6.5 Practical assistance to ISPs

CopperNet and Zamnet are both relatively new companies, run by relatively young people. Unlike the mobile companies in Zambia they cannot call on the experience of an international parent. The parent of Telcel will deliver an ISP in a box.

The local ISPs are having to solve a myriad of problems: how to optimise their limited resources, how to evaluate the advantages of a local Internet Exchange, how to prepare a business plan, how to negotiate with an incumbent? Offering to review their technical, financial, human resources, and marketing processes could provide practical assistance. Each review should only take about a week to complete by an expert. Following this review, appropriate ongoing support could be offered.

6.6 Improved access in Cities

For many people an Internet café is going to be the most economical means of access. Major problems are the licensing procedure (similar to an ISP) and a $45,000 licence fee. Both represent major barriers to entry for a new business. The CA will benefit anyway from the 5% levy on the ISP revenues.

Simplifying the licensing procedures and reducing the fee would help encourage Internet cafés and give more people access to the Internet.

6.7 Improved access in rural areas

The above proposals for Internet cafés would be of some assistance. Alternative forms of access could include fixed GSM/GPRS mobile (with a high antenna), Bush Mail (HF radio for access, on receipt the message is stored, and then sent by e-mail), satellite telephones, and VSAT. Literature or a web site to explain the advantages and disadvantages of different forms of access would be of significant value to potential users.

6.8 Cheaper terminals

The PC is a sophisticated device just for e-mail and web access. We now have the clockwork radio. There would appear to be a similar market for a simple cost effective terminal.

7 List of References

Meetings

1. Meeting with Susan Mulikita, Licensing and Consumer Affairs and Kephas Masiye, Senior Radio Officer, Communications Authority
2. Meeting with the Deputy Permanent Secretary, Mr E M B Chileshe, Ministry of Communications and Transport
3. Contact with Mr Ngosa, Director of Planning and Development, Zamtel.
4. Meeting with Clive Shanwana, Commercial Director, Telcel
5. Meeting with Brendan McSharry, Director, the British Council
6. Meeting with Daniel Mpolokoso, Managing Director, Zamnet
7. Meeting with Thomas Lunga, General Manager (South), CopperNET
8. Meeting with Bwalya Kesenge, Senior Engineer, Zamtel Online

All web site addresses were visited during May 2001.

[1] Except for International calls, which are quoted in $ by Zamtel, all prices are given in US dollars and were converted from Zambian Kwacha at 3000 Kwacha to the US$.

[2] http://www.itu.int/ti/industryoverview/index.htm

[3] http://www2.sn.apc.org/africa/countdet.CFM?countries__ISO_Code=ZM

[4] Derek Wyatt
http://www.kabissa.org/lists/newsletter-submissions-l/0485.html