3.2.4.2 : REGULATORY STRATEGIES FOR INCREASING INTERNET CONNECTIVITY
STRATEGIES DE REGULATION POUR ACCROÎTRE L'ACCES A L'INTERNET (Ant Brooks)

Ant Brooks (ant@hivemind.net), December 1998

© The Internet Construction Company, 1999

1. Introduction

This document provides a broad overview of telecommunications regulations that may have a significant impact on the development of the Internet in a country. It looks at broad infrastructural issues, the typical structure of the Internet market and the possible roles played by existing national telecommunications operators. Several other regulatory issues, which may have an impact on Internet development, are also discussed.

A critical tool in developing this overview was the World Bank's *Economic Toolkit for African Policy Makers*. The *Toolkit* provides an overview of the current state of Internet development in Africa and looks at the likely impacts of the Internet on African telecommunications companies and Internet service provider revenues. It also provides a detailed discussion of policy decisions facing each country and some recommendations for maximising Internet development. The full *Toolkit* is available online at http://www.worldbank.org/infodev/projects/finafcon.htm.

2. Overall regulatory policies

The **Policy Conclusions** section of the World Bank's *Toolkit* gives an excellent three-point summary of good Internet regulatory principles:

> 1. **The importance of not trying to fit the Internet into existing regulatory structures,**
>
> 2. **The power of competition on Internet growth, and**
>
> 3. **The necessity of allowing the Internet to flourish without the burden of unnecessary regulation.**

These principles are very important and should be kept in mind when considering any regulatory policy. The *Toolkit* continues with the following list of needs:

- Low cost access to network equipment
- Countrywide reliable local cost access to ISPs
- An educated and trained user and provider base
- Low cost and reliable local bandwidth connectivity
- Widespread public access to networked computers
- Low cost and reliable access to international bandwidth
- Support for the development of national and African Internet content

Fulfilling each of these requirements in a country will accelerate the growth of the Internet in that country. In order to maximise the rate of growth, a country's regulatory framework should aim to meet as many of these needs as possible.

3. Telecommunications infrastructure

Five of the seven requirements identified by the World Bank (see the list above) are directly related to the availability and performance of the physical telecommunication network infrastructure. In order to allow for strong Internet growth, a country's telecommunications network needs to be cheap, reliable, high-speed and pervasive.

Infrastructure in many African countries is poorly developed and often inferior in quality. Although this lack of development is an impediment to growth, is it at least possible for African nations to bypass technologies used for telecommunications networks in more developed countries and use cheaper, higher-speed technology options to expand their networks.

Although investment in network roll-out is capital intensive, it must be emphasised that the growing use of the Internet will improve the return on investment in the physical infrastructure. This may justify the expansion of the network to areas where it would not have been cost effective if it had only been used for traditional voice calls.

Reflecting back to the three key principles, perhaps the most important principle for the development of telecommunications infrastructure is to ensure competition in the telecommunications market. Further regulation may be needed to maximise the roll out of infrastructure to new geographic areas and to new subscribers, but legislation should encourage operators to *compete* for those markets (e.g. by funding development projects) rather than making delivery of service a regulatory burden. Regulation may also be useful to ensure a reasonable quality of service is available nationally, but this will general follow automatically where there is market competition.

4. Alternative delivery mechanisms

Since rapid roll-out of new telecommunications infrastructure is critical to the rapid growth of the Internet in Africa, it is important that any telecommunications framework encourages the deployment of alternative physical delivery mechanisms. This strategy is expected to have a major impact on improving the penetration of the basic infrastructure, and thus the accessibility of the Internet.

4.1. Wireless technologies

The use of radio-based wireless technologies for delivering communications directly to the end user has advanced extremely rapidly over the past few years, resulting in an explosion of possibilities for improving communications infrastructures. In developing countries in particular, wireless technologies are seen as a particularly important way of addressing needs for local loop capacity because there is relatively so little existing investment to recoup in the small installed base of copper. Wireless systems can offer far more rapid roll out times, greater reliability and lower maintenance costs than copper networks, although they often require skilled technicians to install and they are generally unable to provide the same bandwidth as cable-based systems.

Any telecommunications regulatory environment should, as a matter of course, encourage the deployment of wireless local solutions as an alternative to copper. In addition, where there is a specific urgent need for connectivity in an area not covered by an existing network, the regulatory framework should allow for the provision of radio-based point-to-point data communications solutions. These could range from low speed email-only HF radio links right up to broadband 10Mbps connections using spread spectrum technologies in the 2.4GHz waveband. Such solutions can be viewed as temporary, addressing customer needs and building demand while the more general-purpose copper or wireless local loop solutions are built.

It should be noted that the general use of radio solutions requires a significant level of co-ordination to avoid interfering with the activities of others using radio frequencies.

4.2 Electricity supply grid

Recently developed technologies may make the provision of Internet access using the electrical grid a possibility in many African countries. Although the viability of the technology depends of the specifications of the existing electrical network, use of the electric grid should not be overlooked as an alternative, particularly in countries where the electricity grid is more extensive than the telecommunications grid. This option should be investigated as a matter of course and policy-makers should ensure that there are no regulatory barriers preventing it from being implemented.

4.3. Satellite operations

A number of international satellite operators have already begun to provide voice services on a global basis. Over the next three to five years, data services – including high-speed Internet access – will also become available. Since these services may provide Internet access to areas not covered by any terrestrial network, the policy environment of countries in Africa should support the marketing and sale of Internet access by international satellite operators.

5. Market structure

5.1. Layered market

Although the Internet industry does not easily break down into tidy layers, three main categories of Internet service providers can be distinguished:

- Backbone providers
- Internet access providers
- Content providers and other value-added service providers

A **backbone provider** operates a national Internet Protocol (IP) network and provides access to the global Internet via this national network. **Internet access providers** (IAPs) are responsible for connecting end-users (dial-up users or leased line customers) to an Internet backbone. The IAPs also provide technical support to their users-base. **Content providers** are responsible for the development of on-line content. There are also many other **value-added** services, such as security solutions, Internet training and Internet strategy consulting.

It is important to note that many Internet service providers (ISPs) fall into more than one of these categories.

5.2. Level of competition

Statistical analysis undertaken by the World Bank points to a strong influence of liberalisation of the telecommunications sector on the costs of Internet access for end users. In order to stimulate Internet growth, any regulatory environment should allow for as much competition as possible. Ideally, this should extend as far as the provision of physical network infrastructure; this is particular the case for countries where only a small portion of the population is covered by the existing network.

However, there are often other pressures to maintain a monopoly on some telecommunications services. If this is the situation, particular attention must be given to transparent pricing and fair competition. Services provided by a monopoly service provider should be cost-based, and income derived from these services should not be used to cross-subsidise competitive services.

5.3. Role of existing telcos

It is recommended that telecommunications policy encourage existing operators (particularly monopolies) to focus on being backbone providers. If existing monopoly telecommunications operators also function as Internet access providers and/or a content providers, this should be through a subsidiary company, to ensure transparency and fair competition.

Often, existing monopoly telecommunications providers are uniquely positioned to operate a national IP network. A range of wholesale services should be offered to other Internet access providers, possibly including:

- International Internet bandwidth (via the telco's international connection)
- National Internet bandwidth (on the telco's IP backbone)
- Wholesale access to modem banks on the backbone
- Hosting of modem racks for IAPs who want to operate their own dial-in points-of-presence
- Hosting of content servers

Pricing these for backbone services should be cost-based, in order to encourage rapid growth.

Information flow

It is important that existing telecommunications operators have good communications channels with their Internet access provider customers. Feedback from IAPs on end-user demand will help determine where and when the backbone network should be extended or upgraded.

Policy on 2nd tier ISPs

It is common practice for larger Internet access providers to sell bandwidth to smaller Internet access providers. This concentrates Internet traffic more than usual. Backbone providers should be aware of this concentrating effect – traffic-based charging may be required for exceptionally heavy usage pattern. Although it is not recommended that this issue be dealt with on a policy level, this phenomenon should be considered when developing pricing models for backbone providers.

5.4. Role of other ISPs

It is likely that other Internet service providers will concentrate on the Internet access and content provision segments of the market. However, neither existing nor future operators should be restricted from providing backbone services if they choose to do so. (For example, existing players may want to purchase wholesale access to modem racks from a national telco, but may prefer to operate their own international links.)

Provided that all of the backbone services offered by monopoly telecommunications operators are cost-based, market demand will ensure the most economic Internet access solutions are implemented.

6. Internet telephony

Internet telephony is the conversion of voice traffic into IP (Internet Protocol) data packets and the transmission of that data over the Internet. It is significantly more cost-effective for long-distance or international calls than traditional voice telephony systems, but there are some limitations on the quality of current voice-over-IP systems.

As Lisa Thornton writes in *Internet Telephony in South Africa*, there are three basic possible regulatory responses to Internet telephony. One is to ban it. The second is to attempt to subject it to the existing regulatory framework, including cross-subsidies. And the third is to allow it to operate free of regulation. The debate in the European Union and the USA is whether to subject Internet telephony to the existing regulatory framework or to allow it to operate free of regulation. In South Africa (sadly) the debate is whether or not to ban it.

Although Internet telephony is viewed as a threat by some telecommunications network operators (hence the ban in South Africa), recent World Bank studies suggest that the additional income generated by the growth of the Internet market more than compensates for any loss caused by Internet telephony services. It is recommended that African regulators place no regulatory restrictions on Internet telephony services.

7. Licensing

Although licensing can provide governments and regulators with a tool for monitoring market changes and demands, in general, the Internet develops fastest with a minimum amount of regulation. Unless there is a special pressing need for licences, it is recommended that Internet service providers not require any sort of licence. If licences are mandated for some reason, they should be as simple and as freely available as possible.

8. Regional networking

Although almost all African countries now have some form of Internet access, most nations' primary links are almost all to the United States or Europe. There is still a lack of Internetworking between African countries. As an alternative to multiple regional US links, African nations may want to consider the economies of scale, which might result from regional Internetworking and a consolidation of connections to the US and other parts of the Internet.

As an example, economies of scale on international capacity have reached a point in South Africa which may make it more economical for neighbouring countries to connect to the US via South Africa than directly. The main barriers to such regional networking

are currently the high charges many national telecommunications companies charge for physical links to neighbouring countries.

9. Universal access

Although countrywide local-call access to the Internet is a desirable telecommunications policy, it may be more effective to view universal Internet access as a central government policy issue and not just as a telecommunications policy issue. Central government budgetary decision-makers should be encouraged to make financial allocations for subsidising access and supporting network development, particularly in the health, education and NGO sectors. This is because it is generally untenable to expect a national telecommunications operator (particularly an incumbent monopoly) to subsidise access for these users directly as this will make it difficult for it to maintain cost-based pricing for ISPs and reduces the incentive for ISPs to try to service these sectors.

Programs encouraging universal Internet access should also take into cognisance the fact that Internet access is coupled to access to computer facilities. Universal Internet access programs must provide the necessary computer equipment, as well as the telecommunications infrastructure.

10. Internet and education

It is critical that governments and policy-makers in Africa ensure that the education sector has cost-effective access to the Internet. As with universal access initiatives, governments should concentrate on supporting school and university network initiatives directly.

11. Interconnection

In a situation where more than one Internet service provider has a link out of a country, it is important to establish some form of interconnection between the two providers. This is to ensure that national traffic stays national and does not take up expensive international capacity. If there are relatively few providers with external links, they will probably interconnect directly with each other. As the number of providers with links outside the country grows, so does the requirement for an independently administered interconnection point.

12. Import duties

It is highly recommended that countries wishing to encourage Internet growth reduce customs duties on IT equipment as much as possible. This will lower the cost of access equipment – one of the influencing forces on Internet growth.

13. Recommendations

The **Policy conclusions** section of the World Bank's *Economic Toolkit* concludes with the following list of general policies that will help maximise the rate of Internet adoption in developing countries:

- Liberalisation of the telecommunications network
- Liberalisation of Internet service provision
- Lowering of tariffs on computer and telecommunications equipment
- General tariff re-balancing with possible support for local cost ISP access
- Support for community access to the Internet
- Support for training in the use of the Internet
- Support for local content development
- An Africa-wide backbone

It is recommended that the Internet communities of African nations make information about Internet growth and approaches to Internet regulation readily available to government and policy decision-makers. By considering international experience and local conditions, African nations can optimise the growth of the Internet in Africa.

14. References

- The World Bank's *Economic Toolkit for African Policy Makers*, 1998.
- *The Legal and Regulatory Position of Internet Telephony in South Africa*, by Lisa Thornton, 1998.
- *The Boy Who Cried "Net Access!"* Wired, October 1997.
- *Challenges to the Network: Telecommunications and the Internet*, ITU, 1997.