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**ISSUES FOR SOUTH AFRICA IN DEVELOPING A POLICY FOR
UNIVERSAL ACCESS/SERVICE IN A CHANGING NATIONAL,
REGIONAL AND INTERNATIONAL ENVIRONMENT:
A Case Study for Developing Countries**

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Introduction

South Africa has made enormous improvements in its telecommunication system, and in the scope of its universal access and service coverage in particular. Major contributions to this accomplishment have come from the innovative institutional structure that has been established. The establishment of a Universal Service Agency (USA) has given the universal access/service issues a much higher profile than in most other countries, and provided an additional stimulus to universal service development. The network development obligations negotiated with the restructuring of Telkom have provided the foundation for an impressive expansion of the network to previously unserved areas. The policy to license competition in mobile service has fostered a more rapid rollout of services to both developed and developing areas of South Africa, and the adoption of prepaid mobile has provided access to a great many people who would not have access otherwise. There have been many other contributions from other participants as well.

The challenge for South Africa is building on its past successes and establishing an institutional structure that will foster rapid and continued network expansion in the direction of universal access/service. This short paper is intended to highlight some issues for consideration based on my knowledge and experience about developments around the world, and my limited observations of developments in South Africa.

Some Lessons From Experience in Other Countries

1. Support for Local Participation

Surprisingly, the countries that have the highest rates of universal service in telecommunication have relatively low population densities and large rural and remote areas. The Nordic countries (Denmark, Finland, Iceland, Norway and Sweden), the United States and Canada have been at the top of the list of international comparisons for many years.

In the United States, the passage of the Communications Act of 1934 established the policy objective of providing service to everyone “to the extent feasible”. Although quite extensive network coverage was developed by the established telephone operators, universal service was only achieved by the initiative of those living and working in unserved rural areas who, with various kinds of support, played a major role in extending the network to their areas.

In 1940 only 25% of farm residences in the United States had working telephones¹. The major stimulus to universal service development, first in electricity and then in telephone was the Rural Electrification Administration (REA), established by the federal government to provide low cost loans, technical support and training for the development of local telephone systems in unserved rural areas. These were developed in the form of local municipal operators, cooperatives, small private companies, and even farmer lines, where the rural residents provided a major portion of the human resources to reduce the costs. In the process, the REA helped pioneer adaptations to technologies and services to serve rural areas cheaper and better. In more recent times, the REA program was instrumental in extending universal service to Alaska in the 1970s. Today there are still several thousand of these small local operators throughout the United States providing the necessary network extensions that are essential to the development of universal access/service.

The experience in Canada was similar. Universal service was developed through programs of government support of local initiative, ranging from a province - wide cooperative in the most rural and sparsely settled province, Saskatchewan, to farmers stringing telephone wire along their fences. Following this approach Canada achieved one of the highest universal service penetration rates in the world in a country with one of the lowest population densities.

In Europe, the Nordic countries have always had the highest levels of universal service coverage in Europe, despite the fact that they are the countries with the thinnest population densities and most difficult conditions. For the most part it was done by local initiative, sometimes but not always with federal government support. Finland still has about 65 local telephone operators. The Nordic countries are also leading Europe in information infrastructure development, Internet access and mobile phone penetration.

It is interesting to observe that as the broadband information infrastructure is being developed throughout the United States, Canada and the Nordic countries, history is being repeated. Local participation is once again driving the development of a universal broadband service capacity. Local governments, co-operatives and small local private companies are filling the gap between PTO developments in their service areas and the rural and remote areas. Edwin Parker describes some of these development in an article, "*Closing the Digital Divide in Rural America*", **Telecommunications Policy**, 24, 4, May 2000 (also accessible at www.tpeditor.com).

The lesson I draw from this experience, which includes direct involvement with universal telephone service extension in Alaska, Canada and Australia, and current involvement with information infrastructure development in rural areas

¹ In fact, telephone penetration declined drastically during the depression of the 1930s from a peak of 39% reached during the 1920s. See Garcia, D. L. and Gorenflo, N. R., "Best Practices for Rural Internet Development: The Implications for Universal Service Policy", presented at Telecommunications Policy Research Conference. Alexandria, Va. September 1997.

of the United States Northwest, is that universal service is not likely to be achievable efficiently, effectively or timely, if at all, if the incumbent public telecom operator (PTO) – Telkom in South Africa - is the only major vehicle for implementation. The PTOs have many other constituencies and responsibilities to serve than universal service.

Universal service may only be achievable if the local people in the unserved areas are directly involved and supported. In their considerations, I would encourage my South African colleagues to give serious attention to the possibilities of involvement of local participants in unserved areas, and how they can be supported so as to contribute to the extension of universal access/service. If the USA initiative is to be continued, it would be instructive to examine the specific ways in which the United States REA has supported local initiatives and participation in universal service development. Canadian and Nordic country programs are useful references as well, but tend to be less well documented multiple programs covering similar types of support for local participation.

2. Competition and Participation

It is often believed that competition in telecom will prevent the achievement of universal service, or make it more difficult to achieve. Experience has demonstrated the opposite. Generally, new competitors have been willing to extend the network further into rural areas at lower costs and prices than the incumbent PTO, and typically stimulate the PTO to improve its performance. Formerly unprofitable areas, when viewed from a monopoly perspective, become profitable when viewed from a competitive perspective. After liberalization in the UK in the 1980s, the telephone penetration rate went from about 60% to 85% in a decade, driven mostly by the discovery by British Telecom, now subject to competition, that this was all profitable business.

Competition in extending and expanding the network has been demonstrated to be a major vehicle for achieving universal service goals. In the enormous, sparsely settled, inhospitable regions of Alaska, it was a combination of local participation and competition that brought universal service. Competition expands universal service coverage. It does not restrict it. Whenever competitors appear on the scene, markets are extended. More people are served, not fewer and at reduced costs and prices.

There is an understandable concern about competition encouraging the unnecessary duplication of facilities in wealthy areas and the cream-skimming of highly profitable services. Although this is seldom born out in reality, a cautious competition policy can direct competition to inadequately served regions and services. The suggestion here is that it be seriously considered as a vehicle that can help achieve universal access/service, not as a threat to achieving it.

One way universal service goals are being implemented successfully in some countries is by inviting competitive bids to service unprofitable, poorly served

rural areas. The bids are for how much subsidy would be required to develop specified network development objectives over a specified period. The license contract normally is awarded to the bidder with the minimum subsidy bid, which is typically far lower than expected beforehand. Chile has used this approach with great success in achieving network expansion in recent years.

This is just one way competition can be used to achieve universal access/service goals. Competition need not be, and should not be a substitute for policy and regulation. It can be, and should be a highly effective tool for helping to achieve communication policy objectives – in this case universal service.

3. Convergence and Integration Opportunities

The achievement of universal access/service in telecom often is considered only as a singular objective unrelated to other important policy goals. Experience has shown that there may be major cost and/or benefit advantages to considering universal service network extensions together with other related policy objectives.

The new backbone fiber optic cables in North America and Europe are being laid primarily along the rights of way of electric lines, pipelines, railroads, or highways. Electric operators in particular have similar network configurations to telecom networks, and must establish a communication capacity over their networks to monitor and control the electricity flows. These other infrastructure providers provide a significant potential for reducing the costs of telecom network extension and expanding the capacity provided in rural areas. If they have opportunities to lease access to their rights of way, raw communication capacity, activated communication channels or communication services, this often can increase the incentive to participate in network expansion and introduce a constructive competitive participation in universal service development. This principle can be applied both at the level of transmission networks in regions of the country, and to local network development in particular townships and local areas.

In addition to convergence in the supply of communication capacity, there can be integration of communication needs on the demand side of network extensions. The availability of communication can facilitate the implementation of a wide range of both government (e.g., health, education, welfare) and business (e.g., e-commerce for local firms) services. South Africa has a number of pioneering experimental programs up and running currently. These can be translated into effective public services if new proposals for integrated service development are fostered and supported as vehicles to help expand the economic and social benefits of universal service extensions.

4. Unbundling to Expand Participation

Digital communication technologies make it possible to unbundle the provision of telecom facility networks from the provision of communication and information services that are provided over those networks. This makes it possible for people and firms with good ideas for new services to participate in network development by leasing capacity on the telecom facility network. This unbundling of the facilities network from the services networks is what has made the Internet possible and is now providing the foundation for e-commerce services. This has enormous potential for enhancing the economic justification for network extensions to rural areas, i.e., turning unprofitable network extensions into profitable ones, and stimulating economic development in rural areas.

South Africa has followed an extremely cautious policy on unbundling facilities from services on the telecom network. In assessing its policy for the future, the overwhelming potential benefits for universal access/services extension and rural economic development should be carefully considered.

5. The Mobile Opportunities

Mobile service – and especially prepaid mobile service – has turned out to be an unexpected boon to universal service extension in South Africa and many other countries. For the future, mobile network extensions have the potential to play a significant role in achieving regional, national, Southern African international and global service development. Achieving a universal mobile service, with maximum participation in the development and supply of mobile services, including participation by virtual mobile network operators in rural areas, should be considered as a potentially important element in the next stage universal access/service policy and implementation.

6. Subsidies and Network Economics

The significance of the subsidy necessary to provide universal access/service depends upon the size and wealth of the country, and the distribution of income in the country. South Africa clearly has a far greater problem extending universal service than any developed country, and the necessary subsidy will be many times greater. However it may be helpful to review some important considerations that have come from the study of subsidies and the debates over the magnitudes and significance of subsidies in developed countries.

In most countries where universal service subsidy costs have been calculated, the initial estimates by the incumbent PTO were very high, often 20-25% of total service revenues. However after more detailed study, and a recognition that it is only the incremental costs that are relevant for network extensions, the subsidy cost calculations have been reduced dramatically. In Australia it was found to be about 2% of the revenues of the PTO, Telstra. In the UK, for

fiscal 1996/97 it was between 0.8-1.6% of BT's domestic turnover. In the Nordic countries, they have not bothered to study it as no operator is claiming any subsidy funding support. In the national replies of EU countries to the 1997 Commission questionnaire asking for cost estimates of universal service obligations, only four of 15 countries supplied estimates. The highest figures were 5.5% of turnover for Spain and the Netherlands. And these are estimates that have not been independently examined. The experience has been that once the PTO estimates have been subjected to independent scrutiny, they have been reduced to a fraction of the initial claim or disappeared entirely.

It is also important to assess the extra cost associated with universal service provision with the benefits realized by being the incumbent PTO, with connections to almost every customer and significant economies of scale and scope associated with operating a national network. There is no doubt that these benefits vastly outweigh a few percentage points of additional cost in comparison to competitors. Moreover, as all competitors who wish to provide public services will require interconnection with the PTO, if the PTO costs are the basis of the interconnection charges, as is the plan in virtually all countries, then competitors will be contributing to coverage of the PTO universal service costs.

It is also important to recognize that even the estimates calculated for universal service costs typically fail to recognize the fundamental characteristics of the economics of telecom networks. In fact, almost all network costs are common costs, shared across all users and services. Except in very unusual circumstances, the debate about universal service subsidies is about the allocation of the common network costs. If the extra universal service costs are defined as only the net cost savings to the PTO if a rural community or farm were not served, or if it were cut off from the network, then the costs are reduced further.

It is typically forgotten that if someone is not served, the revenue lost is not just associated with calls *from* that location, but also calls *to* that location. In addition, worldwide experience has shown that for unserved areas revenue estimates of traffic typically underestimate by several times the actual traffic that develops. And with respect to cost, the unit cost of network extensions is reduced significantly by the multiplier effect of expanding calling opportunities. If network penetration is 10%, then 10% of potential users can call each other. For the remaining 90% of potential users, they can't call one another, or send or receive calls from the 10% who are connected. Thus only 1% (10% calling only 10%) of the potential calling opportunities can be actually provided.

If the penetration rate is increased to 20%, a 10% expansion of the network will raise the calling opportunities actually provided to 4% (20% calling 20%), an increase of 4 times. Thus an increase of 10 percentage points in universal service penetration yields an increase of 400% in calling opportunities. If the network is expanded to 40%, the calling opportunities actually provided will increase by another 4 times. Thus, the actual costs of network extension toward universal service can be much higher than the average network cost

without increasing the average cost per calling opportunity created by the network expansion. When the economics of network expansion are considered, it confirms that the universal service cost subsidy issue is a minor problem in developed countries.

Although the need for subsidies is a major problem in developing countries, it is not as great as is often envisioned. It is a challenge that can be met by innovative policy development and implementation, as South Africa has initiated with the USA, and will continue after its consultations and deliberations on the best way forward during the next stage of South African telecom network development.

To achieve its universal access/service goals, South Africa will have to employ subsidies of some kind. In establishing its subsidy structure, South Africa can benefit from considering the experience in other countries. The subsidy systems that work best are the simplest and most transparent systems. The elaborate mechanisms for calculating and sharing universal service subsidy costs, as employed most dramatically in the United States, have become extremely costly to implement. The primary beneficiaries of the process seem to be the lawyers and consultants who participate in it. There are simple, transparent mechanisms for determining subsidy collections and disbursements. South Africa should consider the options carefully in light of its own circumstances.

Universal Access/Service in the Information Age

Concepts of universal service have changed as the telecom network has developed and become increasingly integrated into the economic, social, political and cultural life of people in different countries and regions. The earliest conception of universal service was simply access to a telephone for emergencies, a concept that still applies in most areas of developing countries today. As the telephone became more pervasive, universal service was conceived as a connection first to businesses and then to residences, initially a party line shared with others and later a private connection. In more recent times, with increased household penetration of computers, concerns about a digital line to permit computer networking are being voiced.

Following the European Commission 1992 Review of the telecom sector, the Commission established the scope of universal service as basic voice telephony plus network access supporting voice, Group III fax and low speed data access. This will provide access to the internet for those with a PC and a modem. The terminals necessary to make use of these services are not part of the universal service. Thus, the cost barrier confronting poor people's ability to obtain these services is increased significantly. In reality, this is introducing a two tier universal service standard - telephone service for the poor and internet access for the middle class.

In implementing the Telecommunications Act of 1996, the United States FCC has adopted a different approach to achieving universal service in an information society. Since universal telephone service is considered to have

been achieved and a number of subsidy funding mechanisms are established, the new policy has focused on the deployment of advanced services to rural schools, hospitals, and libraries. A universal service fund has been established for the expenditure of US\$2.25 billion annually for a four year period. All telecom operators must contribute on a proportional basis. Operators providing rural service on a discounted basis may claim reimbursement from the fund. Institutions requesting funds must employ competitive bidding and use price as the primary criteria in selecting a telecom service provider. However, funding does not include acquisition of the technical expertise that may be required for potential applicants to assess their needs or prepare appropriate applications for the universal service funds.

Like the EU approach to universal service, the United States approach is directed toward ensuring the network capacity is in place for advanced information services, not the technical or economic capability of the institutions or individuals to take advantage of this capacity or these advanced services. Being connected to advanced telecom transmission capacity for services one has neither the income to buy, nor the need or associated equipment or skill to use, is not likely to make advanced information services more universal. The effectiveness of universal service policies must be judged by the services that are used, not by those that theoretically could be supplied over the capacity made available.

This information society universal service issue may be viewed as a distant future problem for South Africa. However I believe it is worth considering in South Africa's universal service deliberations today. It highlights one distinction between universal service and universal access. If these issues are considered in the context of universal service policy and implementation during the next phase of development, it may be possible to reduce the "digital divide" both within South Africa and between South Africa and the leading developed countries faster and sooner.

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