



**Convergence and Broadband Implications for South Africa.
Submission from the LINK Centre on to the Department of
Communication Stakeholder Colloquium on
New Telecommunications Policy for South Africa.
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1. Introduction

The globalisation of national economies and societies into a global marketplace and homogenising international culture, welcome or not, is upon us. It is nations with the vision, coherence and ability to mobilise their resources to respond to this challenge that will be best placed to optimise the benefits and ameliorate the inevitable damage.

The rapid transformation of our economies and societies is being driven a range of technological and related economic drivers. For global markets to operate effectively, high bandwidth planetary infrastructures are needed to link financial centres across the planet to conduct their business “at the speed of thought”. For the last decade these metropolitan nodes operated without any reference to remaining two thirds of the world’s people whose only contact with the new economy and society are their further impoverishment as a result of the new volatility of global markets, job losses or environmental damage.

Far from enhancing the existence of the majority of the world’s people, the introduction of new technologies and open markets has served largely to create greater gaps between the haves and have-nots. In the information and communication sector this has been referred to as the ‘digital divide’. While the growing information gap has been on the lips of social movements for nearly a decade, it was only in Okinawa last year that the G8 acknowledged the digital divide as a global development priority.

What is clear from this is that the technology or global trends in themselves are not empowering, indeed unguided they are often destructive. An enabling policy and regulatory environment are critical to ensure that these new global realities provide opportunities for countries to meet more effectively their developmental needs and that access to these technologies and their associated markets is fair and equitable. It is for this reason the LINK Centre welcomes the opportunity of participating in this

timely national colloquium though it regrets the short notice to prepare submissions for the consultative process.

2. Broadband

It is now almost redundant to state that rapid changes in communications technology are blurring the once rigid lines between what is classified as "broadcasting", on the one hand, and what is termed "telecommunications", on the other. The technological environment, which gave rise to distinct regulatory regimes for each, is radically transforming, and the new realities of technological convergence demand a re-examination and consolidation of the regulatory treatment of both. The emergent technologies that give rise to such a need for reclassification are widely referred to as "broadband", and the networks that will provide such technology to the consumer are referred to as "broadband networks." Broadband networks can be understood as networks with "advanced telecommunications capability."¹

Broadband refers then to any technology that allows rapid transmission of large quantities of information, whether text, data, video or voice, at low cost. It is this transmission of all types of information that places broadband at the centre of the convergence debate. Broadband access can occur through cable, whether copper or fibre optic, radio or satellite.

Debates around broadband access have been driven by the emergence of the Internet. It is able to offer traditional services across a range of technologies on a single medium at a fraction of their usual prices such as voice (IP telephony) or webcasting of video or audio, which competes with broadcasting. While the saving grace for traditional broadcasters and telephone operators up until now has been the relatively poor quality of Internet audio and video services compared to those offered by conventional networks, broadband access has the potential to alter that.

¹ The U.S. Telecommunication Act of 1996, in Section 706(c)(1), defines "advance telecommunications capability" as the "High-speed [meaning upload and download speeds of over 200mbps], switched, broadband telecommunications facility that enables users to originate and receive high-quality voice, data, graphics and video telecommunications using any technology."

3. Legal considerations

As law and regulation tend to lag technology development and innovation, it is no surprise that a regulatory classification of broadband networks has yet to be fully developed in South Africa.

Current South African legislation concerning broadcasting and telecommunications, including the Telecommunications Act (No. 103 of 1996) (hereinafter the "Telecom Act"), the Independent Broadcasting Authority Act (No. 153 of 1993) (hereinafter the "IBA Act", and the Broadcasting Act (No. 4 of 1999) (hereinafter the "Broadcasting Act"), are largely silent on the issue of broadband technology and networks per se.

The Broadcasting Act, however, specifically tries to deal with multimedia and satellite broadcasting and signal distribution. Also silent on this issue are the various policy directives issued by the Minister of Posts, Telecommunications and Broadcasting, with the notable exception of the Policy Direction On Global Mobile Personal Communications By Satellite (hereinafter the "GMPCS Directive") issued in December 1998. In that document the word "broadband" is mentioned once, but is not defined anywhere in the GMPCS Directive. GMPS nevertheless clearly fits the criteria of a broadband service and is understood to be such by the International Telecommunications Union. These regulations can therefore be regarded as South African early attempts to pioneer broadband policy.

A review of the current definitions of broadcasting and telecommunications contained in the relevant legislation reveals a need to overhaul the legislation if the potential of broadband technology is to be harnessed. In doing so we highlight the core assumptions which give rise to such definitions, and explain why they may no be longer valid when addressing the regulation of broadband networks.

3.1 *The Telecom Act*

The Telecom Act defines "telecommunication service" as any service provided by a telecommunications system. A "telecommunications system," as defined by the Act is "any

system...used for the purpose of telecommunication." "Telecommunication," in turn, is defined as "...the emission, transmission or reception of a signal from one point to another by means of electricity", etc. The Act as a whole is designed to regulate "telecommunication activities other than broadcasting." In Chapter V of the Telecom Act, a number of telecommunications services are addressed, including, most notably, value-added network services, which include data related services such as the Internet, but exclude "voice" (Section 40(3)). Interestingly, neither "voice" nor "data" are defined in the Act. As we will see later, broadband technology rebuts the distinction between "voice" and "data" because such technology encodes transmitted signals of both into digital bits of information ("packets"), that are then received and decoded by the end user as either voice, data or video or all three.

3.2 *The IBA Act*

Nowhere in the IBA Act are broadband networks specifically mentioned however reference is made to multimedia and satellite services and signal distribution, which are clearly broadband services. The core distinction between broadcast matter and telecommunications matter under both the Telecom Act and the IBA Act is that broadcasting is defined as a "unidirectional telecommunication intended for the public." A "broadcasting service" is the "broadcasting of television or sound material to the public." Further, broadcasting services are provided by means of "Broadcasting Frequency Bands", which is "that part of the radio frequency spectrum which is assigned for the use of broadcasting services by the International Telecommunications Union (ITU)." The inference here is clearly that broadcasting services make use of the electromagnetic frequency spectrum, whereas other telecommunications services do not necessarily do so.

Section 34 of the Broadcasting Act dealing with signal distribution, it is clear that “all broadcasting services, whether through terrestrial frequencies, satellite or telecommunication facilities within the borders of the Republic or from the Republic to other countries will be required to hold a licence issued by the Authority.” This seems to suggest a regulatory structure already in place that will adapt the changing nature of broadcasting.

Further, the terms "television set" and "sound radio set" are each defined in the IBA as pertaining to apparatus used for **receiving** television (visual images which, when broadcast in sequence are seen as moving pictures) and radio (received as sound, and not images or other visible forms) broadcast signals, respectively. Broadband devices offer the promise of not just being able to receive sound, data and video images, but also being able to originate and transmit them. Thus, the terms “television set” and “sound radio set” are likely to become inadequate to describe devices used by consumers in the medium to long-term future.

3.3 The Broadcasting Act

The definitions of "telecommunication" and "broadcasting" are similarly defined in the Broadcasting Act. However, Chapter VII of the Broadcasting Act states that signal distributors, although they must be licensed, will not be subject the limitations on cross-media control (as outlined in Section 49 of the IBA Act), and limitations on control of private broadcasting services (outlined in Section 50 of the IBA Act), will not apply to signal distributors until ICASA has issued recommendations in this regard. This seems to recognise a hybrid status for services that act, in effect, as common carriers for broadcast services. Multichannel distributors are left similarly unrestricted by section VII of the Broadcasting Act. While distinguishing signal distribution and

multichannel distribution from broadcasting in some respects, neither the IBA Act nor the Broadcasting Act go as far as to say that these services *must* allow open access to their facilities by competitors. This could pose potential bottleneck problems in the future, depending on the success of market penetration as well as cross-ownership levels. However, by leaving the issue open for further recommendations by ICASA, the government has reserved the right to address these issues as they arise.

3.4 *The GMPCS Policy Directive*

The GMPCS Directive defines a "GMPCS System" as "any satellite system...providing telecommunications services directly to the end user from a satellite...excluding Public Switched Telecommunications Network (PSTN) satellite services..." Further a GMPCS System can deliver such services via "broadband" or "narrowband." A "GMPCS service", in turn, means a "telecommunications service, ***new and distinct from telecommunications services as defined in the Telecommunications Act...***" (emphasis added). It seems clear that the distinction relates to the category of service delivered, and does not propose to introduce a new definition of "telecommunications service." Hence, GMPCS Services are a type of telecommunications service, and can be grouped alongside other services, such as public switched telecommunications services, mobile cellular telecommunications services, etc.

Like broadcast services, GMPCS services also make use of the electromagnetic radio frequency spectrum. However, as GPMCS Services are defined as "telecommunications services" there is an implication that such services will be delivered "from one point to another" (i.e., point to point), rather than "unidirectional" from the service provider to the "public" (i.e., point to multipoint) as with broadcasting

services. There is, likewise, no stated restriction on the transmission of "voice," "video" or "data" via GMPCS as there is with value-added network services.

4. The Regulatory Treatment of Broadband Networks in Other Countries

4.1. United States.

The U.S. Telecommunication Act of 1996, in Section 706(c)(1), defines "advance telecommunications capability" [broadband] as the "High-speed [meaning upload and download speeds of over 200 kbps], switched, broadband telecommunications facility that enables users to originate and receive high-quality voice, data, graphics and video telecommunications using any technology." The American regulator, the Federal Communications Commission, has taken the stance of aggressively pushing the growth and rollout of broadband services to the public², while at the same time maintaining a hands-off regulatory approach. Apparently, The FCC believes that regulation in the broadband market will hamper its growth at this nascent stage.

While the FCC sees this stance as favouring growth in the market as a whole, it has frustrated Internet Service Providers, as well as the traditional telecommunications networks over which such services are provided. They feel that existing regulation such as interconnection requirements put them at a competitive disadvantage with other companies that are beginning to roll-out broadband services. Specifically, cable service providers, who are not subject to

² See The Report of the Inquiry Concerning the Deployment of Advanced Telecommunications, Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996 (February 2, 1999), at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/fcc99005.txt

interconnection requirements, are favoured by such an approach. Additionally, the 9th Circuit Federal Court of Appeals has recently struck down efforts by a local government (Portland, Oregon), which attempted to force a major cable provider to lease its high-speed internet connections to rivals.

4.2. *UK*

Like most regulatory regimes, that of the UK currently distinguishes between telecommunications and broadcasting. However, the major regulatory bodies, including The Director General of Telecommunications and the Radiocommunications Agency under the Department of Trade and Industry have recognised that the advent of broadband technologies will necessitate a major transformation in the regulatory structure. But the UK approach seems to acknowledge that technological changes will occur in different ways and at different times across the various industry sectors. Accordingly the government considers its first priority "to provide greater coherence in economic regulation across all digital delivery media and all parts of the converging value chain."³ Secondly, the government will reassess the present regulatory distinctions based solely on the method of delivery to the consumer, and take steps to provide greater consistency in the regulation of similar material delivered via different mechanisms.

The question of timing is of utmost importance, as premature regulation based on predictions of the direction of the industry could stifle its growth. Thus, the government has

³ "Regulating Communications: Approaching Convergence In The Information Age (A Consultative Document)", published by The Department of trade and Industry (July 1998) <http://www.dti.gov.uk/converg/index.htm>

advocated an "evolutionary" approach to dealing with broadband technologies.

4.3. *Canada*

On a per-capita basis, Canada is the world leader in cable modem penetration, and like the U.S., the Canadian Regulator (Canadian Radio and Telecommunications Commission) has been challenged by traditional telecommunications carriers to force cable providers to open access to their high-speed internet backbones to ISP's. Canada has taken affirmative steps towards doing this, most notably by requiring, in September 1999, that cable providers make high-speed Internet access available for resale by third party ISPs until such time that full third party access is implemented. Like the U.S., Canada has yet to make any official policy statements regarding the regulation of broadband technologies, preferring instead to wait and see how the industry develops first. However, in mandating that cable providers allow resale by third party ISP's, Canada has at least put cable providers and common carriers on more equal competitive ground⁴.

4.4 *Australia*

As in other countries, broadband services in Australia remain in their infancy. Broadband services have been launched over cable systems. Wireless broadband systems, both mobile and fixed, have not yet been deployed. Moreover, the Australian government continues to struggle with the regulatory definition of services that may be provided over broadband networks. Recently the Australian Government excluded streaming video and radio using the Internet from the definition of broadcasting services under the

⁴ "Broadband Backgrounder: Public Policy Issues Raised By Broadband Technology" Published By The Center For Democracy and Technology (December 2000)

Broadcasting Services Act (BSA)[12].⁵ Consequently, licences are not required under the BSA for an Internet-based video service to be provided. However, the ability of such providers to obtain access to next generation broadband networks remains perilous. It is over these networks that streaming video will be most effective. However, while access to broadband networks remains closed, the providers of streaming video, in addition to the access problems they may face, will need a BSA licence to provide their service. That is because streaming video over a closed broadband network is not provided using the Internet.

Although it has taken bold early steps to distinguish broadband services, by amending the definition of broadcasting service the government has raised issues and potentially created uncertainty in relation to downstream regulation of streaming video under the Broadcasting Services Act, the Telecommunications Act as well as the Trade Practice Act.

5. Arising Policy and Regulatory Issues for South Africa

5.1 Competition and ownership

Despite many regimes, especially in developed economies, espousing market self-regulation as the catalyst for broadband services, evidence from around the world strongly indicates that the introduction of competition and market access to broadband or other services is worth nothing without regulation. The historical domination of markets by monopoly operators in the telecommunications and broadcasting sectors and the overwhelming trend of advance capitalism towards the concentration of ownership of markets requires regulation to create fair

⁵ “Principles For Future Telecommunications Legislation,” by Angus Henderson, Partner Gilbert & Tobin (October 2000)
<http://www.gtlaw.com.au/pubs/principlesforfuturetelecommunications.html>

conditions for market access. In a case such as South Africa where there is a legacy of social and statutory discrimination, to open up services for competition without some attention to issues of redress would simply perpetuate the status quo with regard to ownership and control within these sectors. In addition, while international organisations such as the World Trade Organisation place pressure on developing countries for open access to markets, developing markets may require additional regulation to ensure that local players are ensured some level of participation. Even mature markets which are being opened up for foreign ownership in terms of WTO rules are protective of their locally controlled industries despite having had time to develop and consolidate them.

5.2 Affordability

Another issue critical for South Africa as with other developing countries is that of cost. As with plain old telephony (POTS), the greatest factor inhibiting the take off of services is cost. While experience elsewhere in the world suggests that where services such as the Internet have flourished there is existing or expanding physical infrastructure to ensure access at greater speeds and lower cost, even where services are available, in large parts of the world even basic voice services are not affordable. New low cost broadband technologies have the potential to change this and at the same time provide high-end services with the potential to catalyse the sector in particular and the economy in general.

Even the copper infrastructure traditionally used for fixed line voice telephony has enormous broadband potential. Through innovations in digital technology in the last two to three decades copper networks have been transformed, largely in response to the explosion of Internet to provide greater bandwidth. Internationally by the mid-nineties broadband on the fixed line became applicable initially on the long hauls for 2mbps type services. The variants of X-DSL were already pretty matured technologies by the end of the millennium with rapid deployment already underway in many deregulated economies. These technologies typically use the same old POTS CU infrastructure but improved bandwidth demand availability from a meagre 56,6 64, kbps, to 8mbps, dependant on

distance. With the potential to make available low cost high capacity bandwidth it is imperative that the monopoly provider move more swiftly to make available these technologies at reasonable cost.

These technologies typically use the same old POTS CU infrastructure, but improved bandwidth availability from a meagre 56,6 64, kbps, to 8mbps, dependant on distance. With the infrastructural potential in place to make high capacity bandwidth available, it is imperative that the monopoly provider move more swiftly to make available these technologies at reasonable cost.

Currently Telkom as the fixed line operator has primary rights to providing infrastructure. The planning of the infrastructure is the result of a complex and often contradictory set of demands and requirements. These range from demand for high-end services for the sophisticated business sector to the rural village requiring basic POTS access. The complexities of priorities for an organ of this nature are immense. Balancing the rollout to underserved areas with rebalancing tariffs in order to prepare for competition while at the same time preparing, for the first time, a regulatory chart of accounts in a monopoly operation with little accounting separation historically, is a challenging task. Among these drivers is the issue of delivering broadband services especially in the face of competition. The end of the monopoly will no doubt see a flurry of new technological options available to consumers at considerably lower cost. However, if this process only starts in 2002 or 2003 it will place South Africa a good five years behind other markets, which is will seriously hamper take off within the sector.

5.3. e-Government

In addition, if infrastructural development and application selection is done within government in an integrated and coherent way, major issues relating to equitable service delivery, access to information and other developmental matters could be addressed

The applications for governance on Broadband access would amongst others include:

- Public Sector Campus Access - e.g. Hospitals, tertiary institutions, Correctional Services etc
- Telemedicine to the clinic and home
- Tele-education - access to schools both urban and remote
- Intelligent Transport Systems - Fibre and broadband to the kerb, or to the home
- E-govt services internally and externally - GTC, GTG, GTB
- Information applications such as Government On-line
- Communications access centres.

5.4 Culture and content

Another area not as frequently raised by those countries leading the policy debates on broadband and convergence is that of developing a broader range of multimedia content, particularly in non-English languages. This presents a particularly strong challenge to regulators in the area of local content development. Traditionally local content requirements have only applied to conventional broadcasters. The question this raises is whether it is desirable, or even possible, to monitor and police domestic regulations for what is now essentially a global network and business.

All these matters need special consideration against the backdrop of converging services made possible by broadband networks. The Special Project Unit in the office of the Secretary General of the International Telecommunications Union has identified a range of policy and regulatory issues pertinent to broadband.⁶ We explore some of these in relation to South Africa.

Do broadband networks raise new regulatory challenges that required new regulatory frameworks or are existing frameworks satisfactory?

The high cost of broadband infrastructure raises policy issues of whether infrastructure or service competition should be encouraged. This is a

question that will require serious examination in South Africa. As a developing country, is the duplication of infrastructure the most effective use of resources or does infrastructural competition create more opportunities in the longer term? Either way it provides the first to market with a considerable advantage that may require regulatory intervention, particularly on competition grounds.

Should the regulation of equivalent service be equal irrespective of the medium of delivery? It is still appropriate to regulate different services (e.g. voice, data, and video) in different ways even if the same medium and they are indistinguishable at the level of bits?

This is one of the most controversial areas of regulation in the newly converged areas of broadcasting, telecommunication and IT. Traditionally telecommunications operators and regulators have not had to concern themselves with the more nuanced and political area of content regulation, which has been left to broadcasting regulators. Those coming from the historically unregulated area of IT generally struggle with both infrastructure and services regulation and content regulation.

The problems with regulating equivalent services in the same manner irrespective of the medium of delivery, is that it is often the very mode of delivery and specifically the use of a scarce public resource that justified regulation of certain media. It was precisely what was thought to be the finite nature of analogue spectrum that prompted regulation of radio services in the early part of the last century. The prospect of more or less unlimited spectrum offer by digitisation has profoundly undermined one of the major premises of radio regulation.

On the other hand regulating similar services differently on the basis of their mode of delivery undermines one of the central practices of best practice regulation, namely technological neutrality. Technology specific regulation has the potential to discriminate against different operators and result in unfair competition. Those in favour of different or no regulation for similar services on different platforms argue that that is the very medium of

⁶ See www.itu.int

delivery that makes them distinctive. It is for that reason that they reach different audiences and that from a fair competition point of view what differentiates their cost structure and therefore presumably their obligations.

It may be worth noting, however, that in the short to medium term, the average consumer's access to media services will remain relatively unchanged in terms of medium of delivery. Thus, a regulatory regime which acts too soon to distinguish content by medium of delivery may risk downstream difficulty in promoting investment in new technologies.

Is it necessary to converge regulatory structures in order to ensure balance in the regulation of converged technologies?

The levels of co-ordination and integration required for broadband services to operate certainly require a rethink of the historical separation of broadcasting and telecommunications structures. Perhaps more important and more challenging than the physical integration of these historically distinct agencies however is the philosophical integration into a new regulatory approach much more encompassing than the sum of the two. Effective regulation in the era of convergence will require greater flexibility and imagination than ever before if the benefits of the new technologies are going to be equitable but innovation and investment not stifled.

How can effective competition be established and maintained?

For many countries elsewhere in the world the debates are somewhat different as they are introducing broadband services to already liberalised markets. The new challenges posed by broadband technologies will be compounded by the need to develop strong rules and practices on basic competition regulation that had not yet been adequately formulated. In addition to the social and economic regulatory challenges posed by converging networks and technology, South Africa has yet to provide the basics of a fair competitive regime that will reduce the barriers for new entrants to the market and safeguard the interests of consumers.

The key areas of such regulation include:

- Universal service and access financing
- Tariff control
- Prohibitions on cross-subsidy and discrimination
- Accounting separation
- Interconnection.

What level of cross ownership between different networks should be permitted?

The issue of cross ownership, so central to the policy objective of ensuring democracy and diversity of information and opinion, is very threatened by the realities of this new global industry. On the one hand new technologies make possible the access to more information than ever before to those with the means to access it. On the other hand is the trend towards greater concentration of ownership among the biggest global players with recent mergers towards establishing effective convergence-ready companies, commanding the highest prices ever recorded in any sector.

From a policy perspective, while one may seek to enable the participation of multiple players especially local players, the capital outlay required to build and operate broadband networks is substantial. The likely players with the resources to sink these substantial investments into the country will be those who can optimise and leverage their existing business across new platforms. Multimedia, almost by definition, will make strict cross media restriction very difficult. If they are strictly implemented they are likely to stifle investment and business and indeed real competition. If serious infrastructural competition is a policy objective, cross ownership and foreign ownership limitation will need to be made more flexible, creative participation mechanisms for local business developed and opportunities for service competition increased. Not developing a careful framework to ensure these outcomes will simply allow the first to market in the broadcasting and telecommunications sectors to become the de facto monopoly gateway providers to the home.

Would this require, for instance, imposing infrastructure sharing requirements, or standardising open standards for set top decoders,

publicly support the establishment of alternative infrastructures or introducing measure to ensure the efficient use of spectrum?

Because of the importance of being first to market it is likely that if South Africa wishes to reduce the barriers for new entrants and ensure multiple players at least initially infrastructure sharing requirements, such as roaming for new entrants on competitor networks will be necessary. Standardisation of receivers and decoders to avoid “lock-in” into dominant subscriber services is critical to protecting new entrants and consumers as is limitations on the period of subscriber contracts. In this regard numbering portability becomes a major competition issue to make possible the movement of consumers between services without the loss of the number and the associated costs for business and inconvenience for individual consumers.

Should existing telecom networks be opened to broadband competition by, for example unbundling local loops?

Several debates in the more developed economies place the unbundling of the local loop at the centre of delivering competition in the information age⁷. In the UK the telecom regulator Ofcom required British Telecom to make available its local loops to the other operators as the central mechanism to introduce competition into the provision of higher bandwidth access. The regulator describes this not as an end in itself but as the beginning of a “process to facilitate the delivery of high-speed information age services to consumers”. It argued that while the dominant operator in the UK had gone to considerable length to develop broadband services which was encouraged and welcomed, but that “BT alone providing access was not sufficient to ensure competitive prices and choice for consumers, nor to encourage innovation in the provision of access”.

While Britain with its high levels of services access and quality, high per capita income and strong economy provides a very different context than South Africa, the principles driving the unbundling of the local loop

⁷ OFTEL (1999) Access to Bandwidth: Delivering Competition for the Information Age, at www.ofcom.gov.uk

pertains strongly to South Africa. The development and growth of the new economy and information society however they are defined and whatever national priorities overlay them, is dependent on access to bandwidth. Unbundling the local loop is an obvious mechanism for the creation and development of service competition and for making possible the engagement of consumers in that new economy and society.

What type of universal services requirements may be appropriate for broadband services?

That South Africa will need to pay special attention to ensuring that this happens in ways that are equitable to all her citizens, especially those that are not currently consumers of these services is a given.

Given the constraints identified earlier of licensing global networks and placing effective public service obligations or ownership limitation on them, the principle of “pay or play” would have to be adopted from a regulatory point of view. If such an approach was kept flexible and simple it could be implemented effectively and efficiently to provide national agencies with the resources to ensure that the benefits of these enabling and lucrative sectors are enjoyed by all. It would be able to recognise and encourage those operators and companies delivering services or innovating technologies that redress past imbalances or provide developmental solutions.

Broadband however by its very nature has the potential to alleviate current communication backlogs. The CU xDSL variants offer important breakthroughs in basic services provision and access. As international trends move to defining basic universal service in terms of a full range of services, including Internet, it is likely that Internet Protocol (IP) will become the de-facto, mainstream carrier of all types of traffic. The benefits of this from a policy and regulatory point of view are manifold. At a human level the adoption of this approach provides practical ways of addressing the digital divide. This is made possible further at the technical level by leapfrogging traditional infrastructural developmental stages which is likely

to spawn a range of multipliers including capital investment and service sector growth.

6. Conclusions

In the time available it has not been possible to research and explore fully the potential offered by broadband services or to identify comprehensively the current restraints or future conditions that will be required to facilitate and encourage its large scale adoption and application.

What is apparent is that the development of broadband networks and application of the associated technologies is intrinsic to the development of the information and communication sectors specifically and the economy as a whole. With sound infrastructural planning and innovative regulation, broadband has the potential not only to provide high-end services to the business sectors but a range of low cost, high quality services to all.

Critical to this is a policy framework that encourages the vast amounts of local and foreign investment needed, together with a regulatory regime that guarantees fair competition and consumer protection. The basic elements of these, many of which are absent currently, include a fair interconnection and facilities leasing regime that encourages new business, tariff regulation that protects consumers and mechanisms to avoid predatory and discriminatory pricing by competitors. The importance of accounting separation in a situation where a monopoly operator has existed on the basis of extensive and often unaided cross subsidisation is also critical. Until this is done, it will be impossible to apply cost based mechanisms that encourage competition such as interconnection and local loop unbundling.

Finally, from a more overarching position, the need to integrate various policy initiatives and implementation of projects into a single coherent strategy has become imperative for the success, indeed survival, of the country in the information era. It will no longer suffice to develop national

broadcasting or e-commerce policies distinct from IT trade strategies or health and educational policies separate from communication and information policies. The time has come for policies such as those being discussed for the colloquium to be part of a broad national information and communication infrastructure co-ordinate centrally, ideally through the President's office.