

## Draft WGIG Issue Paper on Telecommunications Infra-structure, Broadband Access, and Convergence with NGN

This paper is a 'draft working paper' reflecting the preliminary findings of the drafting team. It has been subject to review by all WGIG members, but it does not necessarily present a consensus position nor does it contain agreed language accepted by every member. The purpose of this draft is to provide a basis for the ongoing work of the group. It is therefore not to be seen as a chapter of the final WGIG report, but rather as raw material that will be used when drafting the report. This draft working paper has been published on the WGIG website for public comment, so it will evolve, taking into account input from governments and stakeholders.

### Issue (what?)

The combination of civil works, towers, antennae and cables, coupled with the hardware and software comprising access, switches and transmission systems all combine to constitute the telecommunications infrastructure. Optical fibre cables, terrestrial wireless, and satellite systems are all key components of the modern infrastructure.

From the mid-1980's the growth of computer communications was evident. Fortunately, the same digital technology that led to the demand for increased bandwidths to enable faster transmission of computer data was also emerging as the most cost effective way to meet the new demand. The private sector rose to the occasion and network speed and quality improved significantly.

But improvements in hardware and software of digital technology accelerated as the internet created huge new demands for broadband access to the telecommunications backbone infrastructure.

Modern switches and transmission systems are all digital, with the latest Next Generation Networks (NGN), employing the "internet technologies". This unique technology provides a more efficient means of transporting all services in a single common digital format thus enabling the convergence of voice, video, data and image content. However, the development of IP-based NGNs raises significant governance challenges in the following areas:

- **Financing infrastructure development:** IP-based NGNs threaten to undermine the "business model" of traditional telecommunication network financing, both nationally and internationally. In the past, these networks derived the great majority of their revenues from voice services, and subsidized the extension of access in uneconomic serving areas out of urban/business revenues. This continued to be the case even after the introduction of privatization and competition. Today, voice revenues are still the "cash cow" of traditional network providers, and new subsidy mechanism adapted to the needs of competitive marketplaces (e.g. universal service funds) are still in place. However, the cost of carrying voice on the Internet/NGNs is close to zero, and revenues will come from the kinds of high-bandwidth applications traditionally offered by the media or carried on computer networks. The development of NGNs therefore exposes traditional infrastructure providers to new sources of competition and threatens to deprive them of their principal sources of revenue. This situation is compounded by the fact that the International Telecommunication Union (ITU) accounting rate system, which was

traditionally used to share revenues resulting from international traffic, was tilted in favour of developing countries in terms of revenue flows, and therefore was an important source of hard currency that could be invested in network development (although often was not). Under traditional Internet arrangements, which involve the lease of full circuits to connect with the Internet backbone, monies tend to flow the other way, towards developed countries. As a result of these factors, traditional infrastructure providers in developed and developing countries alike – which still bear important “public good” obligations that their competitors do not – face a tremendous challenge in adapting their business models to the new marketplace, and in generating the revenue streams required to develop national infrastructure and extend access to it.

- ***Transforming network architectures:*** The transformation of traditional public telecommunications networks into IP-based NGNs will require significant technical and human resources as well as financial resources. There will be tremendous competition for the resources world wide. Traditional arrangements for providing developing countries with the technical and human resources they needed to build and maintain their network infrastructures – which involved a combination of assistance from equipment vendors and service providers, along with a small technical assistance programme provided by the ITU – were not entirely successful in creating the capacity for self-sustaining technical growth and development. The emergence of IP-based NGNs requires fundamentally new and different technical and human capacities. What governance arrangements are needed – in the private sector, in the public sector, and cooperatively – to provide these?
- ***Transforming policy and regulation:*** As well as challenging established financing mechanism and arrangements for building technical and human capacity, the emergence of IP-based NGNs, which will lead to the convergence of formerly distinct networks and services, raises tremendous challenges for policy-makers and regulators in all countries, but particularly in developing countries. Adapting existing arrangements for helping to build this capacity, through information sharing, education and training, and by providing expert advice and assistance, is a very significant challenge.

Research institutions and networks, notably National Research and Education Networks (NRENs) and their regional or inter-regional alliances are active in the production and experimentation with these networks, the software, services, and products they deliver, and the training of human resources that operate them. Since the security of these networks is much more related to computer security and information security in the broadest sense, and therefore a large space above the security of traditional networks, this area also receives a large boost from academic institutions and NRENs. In many developing countries the NRENs represent the only indigenous, open effort to actually know, dominate and spread these technologies and apply them to the common good, far in advance of companies, the general public, and regulators.

The WSIS Declaration of Principles at paragraph B22 states that:

*“A well-developed information and communication network infrastructure and applications, adapted to regional, national and local conditions, easily-accessible and affordable, and making greater use of broadband and other innovative technologies where possible, can accelerate the social and economic progress of countries, and the well-being of all individuals, communities and peoples. “*

The governance issue here relates to the possibility that the future development of the new network and its governance could develop in a way that is not “responsive to the need of all the

world's people." [UN Secretary General Kofi Annan] It seems clear that convergence raises some real questions regarding the interface between telecommunication and Internet oriented rules. These regulatory matters are being studied in the developed countries and may very well lead to the adoption of new rules in the Organization for Economic Cooperation and Development (OECD) countries to the exclusion of developing countries, with the result that collective governance at the global level becomes even more difficult.

Drakes has warned that as the developed countries proceed with efforts to preserve traditional regulatory objectives in an IP-based environment, *"issues like national security and law enforcement requirements, public safety, disability access, services reliability and reporting obligations, restoration after failures, call prioritization in emergencies, privacy and consumer protection, universal service obligations, service categorization, inter-carrier compensation, competition and more are coming under scrutiny, and over time more governments will be compelled to undertake similar assessments."* [Internet Governance: A Grand Collaboration. Edited by Don MacLean. Published by the UN ICT Task Force. Page 140]. As these matters will certainly impact at a global level, global solutions should be sought inclusively.

### **Attribution to category / ies**

Equitable distribution of resources  
Access for all  
Secure and stable operation of the Internet

### **Assessment of risks and problems: what works, what doesn't, where are the risks?**

#### What works?

From a 'governance' perspective, the managed development of the public switched telephone network since the nineteenth century is nothing less than successful. With a mix of heavy and light regulation from country to country the monopoly business model was encouraged until policy makers considered that the service had reached a level of maturity. Competition was then introduced in the developed world from the 1980's. Nevertheless, the need for 'flexible or light' regulation has continued to this day, mainly to manage bottlenecks in the absence of effective competition. However, in a market with the correct conditions – competition works.

Many still argue about the merits and demerits of regulation. While it is clear that competition provides the better opportunity for the future development of the network, well trained and independent regulators have served the interest of consumers well while encouraging the development of the network. Standards have also played an important role in guiding the evolution of the network as equipment suppliers from almost all developed countries competed in a telecommunications market with high sustained growth.

This infrastructure provides the backbone on which all telecommunications, broadcasting and computer based services are transported separately or in an integrated form. This evolution to the NGN with its integrated or converged services will present new challenges to the policy makers.

#### What doesn't work?

Over protection and over regulation no longer works in any market. The days of uncontrolled monopolies and dominant incumbent operators are over in an increasing number of countries. Not

even in small markets is it necessary to continue with such policies as the new IP based and wireless technologies make the competition model even more attractive. It has therefore become very difficult to deny that the lack of competition does not work.

The benefits of standards have been lauded in the era of a more stable technology. Now there is concern that the adoption of new standards prematurely could possibly be “locking in outdated technology,” “locking out new technology” or used as barrier to trade. So with standards, like any law targeting information technology, broad principles may be more desirable rather than specific and detailed standards or rules which could soon become redundant as the technology advances.

There is the risk that governance of the internet, Voice Over Internet Protocol (VOIP), broadcasting and other services will collide in the NGN environment if old policies and rules are not changed to reflect broader more technology neutral principles and flexible regulatory approaches. There is some concern that regulatory compliance costs can burden both industry and consumer. What is certain is that uncoordinated regulatory functions will bring disasters in a converging services environment. Basic but critical issues such as ‘who pays who for what’ and how the developing countries will continue to benefit from an ITU type forum to look after their own interests remains.

In addition, where the market conditions are favourable, the risks of not relaxing regulation, not introducing competition and embracing the new technology are great. Social and economic progress are very likely to be impeded as investment opportunities are lost, not only in the telecommunications sector but in other sectors highly dependent on information and communication technology. A high priced substandard Information and Communication Technology (ICT) environment can be shown to be a distinct barrier to innovation, entrepreneurship and employment, and is therefore most undesirable.

### **Actors (who, with whom?)**

Relevant stakeholders include Government, private sector, civil society and international organizations. This paper attempts to identify the main actors among the different stakeholders, clearly recognizing that there are others. While not neglecting national issues, especially where they significantly impact the global telecommunications infrastructure, the focus at this stage is on governance actors of global significance.

#### Governments:

This approach holds well except in the case of Governments; for although some Governments clearly have global influence, the actions of all Government, at the national level, are capable of impacting the flow of global communications. Government’s policies as they relate to economic and social development, national security, investment, regulation, competition, universal telephone and internet services will all impact on the development of the global telecommunications infrastructure.

In the case of Governments, the United States (US) is undoubtedly the main actor. The roots of telecommunications infrastructure are in the United Kingdom (UK) and the US, but the scale and variety of telecommunication networks developed faster in the US than in the UK. Perhaps issues of entrepreneurship, investment and market demand would explain such development in the areas of cables, wireless and satellite components of the telecommunications infrastructure. Developments in the US have therefore spread into the global network.

### Private sector:

Consistent with US Government policy, its private sector strongly supports self-regulation. More importantly however the private sector is constantly researching and pursuing the development of innovative technologies and delivering hardware and software solutions that help to propel the development of the global telecommunications infrastructure.

Historically, it was the Western Union telegraph and the AT&T Bell telephone companies that conducted the research, development, equipment manufacture, network design and construction which formed the backbone of the US telecommunications infrastructure. After 'deregulation', a multitude of other private firms entered the market in every segment. As software driven microprocessor controlled systems were developed, different types of manufacturing and operating firms emerged in the developed world. With the enabling digital technology therefore, phone companies are now providing data communications and video services, Closed Circuit Television (CCTV) companies are providing phone services, and all communication services are now carried on the internet which is spawning a host of new services.

In the meantime, private sector investment in network infrastructure and broadband access technologies continues.

Throughout this process, industry specific associations emerged to advance the interests of their particular sector or sub-sector. It is perhaps superfluous to try to identify the main actor in each segment of the telecommunications infrastructure, but there are ICT private sector associations such as the Information Technology Association of America (ITAA), which is the leading actor in the IT sector in the US with "over 380 corporate members". "The Association plays the leading role in issues of IT industry concern including ..., telecommunications competition, ... consumer protection ... and government IT procurement." [www.ita.org](http://www.ita.org)

Another strong private sector actor is the World Information Technology and Services Alliance (WITSA). Founded in 1971, this global alliance of information technology associations represents some 90% of the world's IT market. Their web site informs that they play an active advocacy role in international public policy issues, encouraging cross-industry and Government co-operation to, among other things, enhance information security. WITSA asserts that the internet must be protected at the international, regional, national and individual level, and publishes some principles to guide the development of future policy. [www.witsa.org](http://www.witsa.org).

In addition, the International Chamber of Commerce (ICC) continues to be an active advocate for the private sector since the 1940's. Through its Task Force on Telecoms Policy, the ICC has embraced views from a wide range of stakeholders and has recently produced a policy statement on VOIP which demonstrated its continuing interest in the development of new technology. [www.iccwbo.org/home/menu\\_electronic\\_business.aspand](http://www.iccwbo.org/home/menu_electronic_business.aspand)

The interests of these associations include certain elements of governance specific to the individual sub-sector(s). As traditional telephony rules collide with traditional broadcasting rules, for example, the trade associations harness the technical expertise and commercial interests of their members to promote technical solutions and self-regulatory schemes in countries where the Government prefers to promote competition as the alternative to regulation.

### Civil society:

The Centre for Civil Society (CCS) of the London School of Economics defines civil society in part as: "*Civil society refers to the arena of uncoerced collective action around shared interests, purposes and values....*" [www.lse.ac.uk](http://www.lse.ac.uk)

Civil society is therefore the term used to represent the variety of organizations working alongside Government and the private sector to ensure progress in areas such as human rights, democracy and sustainable development. No Civil Society group has as yet been found to identify specifically with telecommunications. However, apart from the large number of consumer protection groups, some human rights groups may very well be pursuing the long standing call for access to a telephone, and the more recent call for action to ‘bridge the digital divide’.

It is noted that their role in promoting a more inclusive democracy and global governance has been recognized to the extent that some Inter-Governmental Organizations (IGO’s) such as the World Trade Organization (WTO) have a formal mandate to consult and cooperate with NGO’s operating in the relevant area. [WTO Agreement Article V.2.]

Universities are sometimes considered to fall within the private sector or civil society stakeholder categories. These institutions, like NREN’s contribute to research and development of innovative technologies and applications as well as promoting the diffusion of NGN technologies.

#### International:

Now since this paper takes the view that governance at the global level should be the primary consideration, it is considered appropriate to identify the main actor in the telecommunications infrastructure (both national and international), broadband access, convergence and NGN.

As early as 1865, Governments realized the need for international coordination of infrastructure development if messages were to flow seamlessly across borders and the ITU was born. Over the years, both network operators, as well as equipment manufacturers separately, begun to collaborate in international standards organizations in order to ensure the orderly development of the global telecommunications infrastructure.

With the arrival of software driven networks and converging technologies another level of “hard governance” became necessary. To its credit the ITU re-invented itself in the mid-1990’s and continues to play the leading role in the development of standards which guide the advancement of the global telecommunications infrastructure including the NGN. The OECD, through its *“Working Party on Telecommunication and Information Services Policy (TISP) looks at telecommunications and Internet policy, promotes the exchange of experience among OECD members and reviews developments in information infrastructure. The focus is on regulatory reform, the convergence of telecommunication, internet, cable television and broadcasting networks over fixed and wireless networks.”* [www.oecd.org](http://www.oecd.org)

Also, as services trade was identified as becoming the most significant sector in the global economy, the WTO launched negotiations in services during the Uruguay Round. This resulted in the General Agreement on Trade in Services (GATS) which has some special references to telecommunications policy and regulations, as well as trade in information technology products. GATS may very well lead to a shift in telecommunications policy decision making towards the WTO. If this is so, then it can be expected that the legal commitment of Governments to WTO rules may encourage Governments’ retention of regulatory oversight of this critical service sector.

#### **Forums (where, when?)**

The key role that telecommunications has played in national development since its inception is due in part to the role played by the ITU which is still providing the leading forums for joint

Government and industry discussion of this subject. The ITU has a membership of 189 states and 652 private sector members and conducts consultations in all of the regions of the world. In recent years these discussions are also covering broadband, convergence and the NGN. However, because of the global importance of the issues affecting these subjects several stakeholders are contributing through publications, meetings or on-line communication processes. These stakeholders include the European Commission, IGO's such as the UN, WTO, ITU, OECD, CITEL, CTO and national agencies such as the FCC and NREN's.

The UN, through its World Summit on the Information Society (WSIS) process and its Task Force on Internet Governance continues to provide all-inclusive forums for dialogue on the public policy issues.

Now because of its pre-eminent role in making the internet the ubiquitous super service that it is, the telecommunications infrastructure retains its place, not at the center, but at the foundation of the internet governance debate. Consequently, there are several initiatives at present in which national authorities are reviewing existing regulatory frameworks in light of Internet developments. The United States Federal Communication Commission (FCC), along with other developed country Government agencies, is conducting several procedures in this area.

As outlined above, industry associations are vigorously representing the interests of their members in internal as well as in public forums, while civil society groups are representing the wider public in areas where consumer rights are perceived to be affected.

### **Governance mechanisms (how?)**

The range of actors is admirable. The range of forums would appear to be acceptable and it is clear that participation is wide. Whether such wide participation is effective in embracing the views of all stakeholders to the extent that those views impact on the decisions made is uncertain. The power of OECD influence, US supremacy and private sector preferences is likely to combine and ensure that decisions are either not reached or are made consistent with their preferences. Consequently, developing countries and civil society continue to call for 'meaningful participation'. As far as developing countries are concerned, it seems reasonable to conclude that the ITU not only provides such opportunities on a continuing basis around regions of the world but appropriate technical assistance and training remains a key feature of this participation. However, as noted in a study of developing country participation in international ICT decision-making carried out by the Commonwealth Telecommunication Organization (CTO) in 2002, much work needs to be done in all international forums, including the ITU, to achieve effective participation by developing country stakeholders.

The future of the telecommunications infrastructure, broadband access, convergence and the NGN is technically secure. As is the case with all emerging technologies, the entrepreneurial freedom of the private sector, with the combined efforts of its technology innovators and the variety of players in competitive markets, is more likely to influence the direction these technologies take. However, a key question will be what kinds of governance mechanisms are needed to ensure that people everywhere benefit from these new technologies, and what kinds of rules are appropriate to govern their development, implementation and use.

In the monopoly era, the development of international telecommunication networks was facilitated by different kinds of decisions ranging from treaty agreements to govern the international exchange of telecommunication services (the ITU International Telecommunication Regulations) and to allocate and manage the use of radio frequency spectrum and satellite orbital positions (the ITU Radio Regulations). In addition, decisions that were not legally binding but

nonetheless strongly recommended were made with respect to technical, operational and tariff standards in the ITU and other forums. As well, decisions were made about how best to provide technical and financial assistance to developing countries.

In the competitive era, the ITU treaty governing international telecommunications has been largely superseded by the WTO treaties regarding trade in telecommunications and other services. However, the ITU treaty regulating the radio frequency spectrum and satellite orbital positions, as well as its standards-making activities, have arguably become more important than in the past. As well, decisions about how best to help developing countries acquire and grow technical, financial, human, policy and regulatory capacity are more important – not less important – in a competitive marketplace.

The traditional Internet brings with it an entirely different set of governance mechanisms and significantly different kinds of governance decisions. To cite two critical examples:

- the mechanisms that manage Internet names and numbers and the nature of the decisions generated by these mechanisms are very different from the mechanisms used by the ITU to manage the telephone numbering system, the radio frequency spectrum, and satellite orbital positions. The Internet system is based on private national law, contracts and has a dispute resolution mechanism, while the ITU system is based on public international law, agreements that range from treaty provisions to recommended practices and has no dispute resolution mechanism.
- the mechanisms used by the Internet Engineering Task Force (IETF) on the one hand and the ITU Telecommunication Standardization Bureau (TSB) on the other hand to develop standards, and the nature of the standards that emerge from their processes, are likewise very different.

What will be the result of the bringing together of these two different worlds through the emergence of NGNs? At present, there is already a good deal of convergence at the technical level, although the two traditions remain ‘worlds apart’ at the policy and regulatory levels. Different scenarios can be envisaged: telecoms and Internet governance mechanisms may continue to run on parallel tracks; they may merge and morph into hybrid arrangements; or one set may triumph at the expense of the other.

### **Adequacy measured against criteria / benchmarks set out in Declaration of Principles:**

“Internet governance was inextricably linked to the larger issue of globalization” [Internet Governance: A Grand Collaboration. Edited by Don MacLean. Published by the UN ICT Task Force. Page 345] and is therefore unlikely to succeed in the absence of a clearly coordinated multilateral process. The success of the multilateral effort in telecommunications, intellectual property and trade, are probably examples to be considered – although none of these mechanisms fully meets the standards set out in the WSIS declaration. As well, while containing a number of attractive and innovative features that could usefully be incorporated into traditional telecoms governance mechanisms, Internet governance institutions likewise fall short of the high standards set by WSIS. Reform and innovation are needed on both sides, whether convergence occurs or separate tracks continue to be followed.

Transparency and inclusiveness in democratic processes are prerequisites for success at the multilateral level.



Any effort which embraces the need to ‘bridge the digital divide’ must embrace the principle of “special and differential treatment” for developing countries which is a key feature in the multilateral trade environment.

As observed at the Global Forum on Internet Governance: “as governance issues move toward transactions and content (away from technical considerations), local standards, laws and values would become more pertinent and that heterogeneity would complicate the ability to develop and implement a global governance regime.”