Eastern Caribbean Telecommunications Authority

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Technological Advances and Competition in the Telecommunications Sector in the ECTEL Member States

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Abstract

There can be little doubt of the benefits of competition in the telecommunications industry to individual consumers and society as a whole through lower prices, innovative products and services and increased consumer choice. To foster competition, regulators use a number of competitive safeguards to protect new entrants against the incumbent's exercise of market power. There have been significant changes in the telecommunications sector due to technological advances. This paper seeks to examine how changes in technology and convergence may affect the competitive landscape in the telecommunications sector with specific reference to the ECTEL Member States. It also seeks to examine the regulatory challenges and responses in a changing competitive environment.

Background - The ECTEL Member States

The OECS Telecommunication Reform Project was launched in 1998 with the signing of an agreement between the five OECS states of Dominica, Grenada, St Kitts and Nevis, Saint Lucia and St Vincent and the Grenadines, to establish a common regulatory framework for the telecommunications sector. Trading trends indicated that the region needed to diversify its economy from dependence on agriculture and place greater emphasis on services. Telecommunication was recognized as critical to this economic diversification and it was agreed that the sector should be opened to competition.

The main objective of the OECS Telecommunications Reform Project was to introduce pro-competition reforms and thus attract new entrants to the liberalized market. The Telecommunications Acts of 2000 and 2001 provided the legal framework for the liberalization rescinding the monopoly rights of Cable & Wireless in the ECTEL Member States. Under the new Telecommunications Act, licences were granted to Cable & Wireless for the provision of fixed, mobile and Internet services in 2001. Since liberalization, more than forty licences had been issued to new entrants in the ECTEL Member States for Fixed Public, Public Mobile and Internet Networks and Services.

As with most newly liberalized telecommunications sectors the sector in the ECTEL Member States is for the most part characterized by the presence of a main dominant operator facing a competitive fringe of new entrants. In this situation, there is a fundamental concern that simply permitting free competition in itself may not be adequate to generate maximum consumer benefits because the dominant operators are positioned to potentially abuse their dominance and harm competition. The legislative and regulatory framework in the ECTEL Member States provides for a number of competitive safeguards to protect new entrants against the incumbent's exercise of market power and to promote competition.

There have however been significant changes in the telecommunications sector due to technological advances. This paper seeks to examine how changes in technology may affect the competitive landscape in the telecommunications sector with specific reference to the ECTEL Member States.

Competitive Landscape in the ECTEL Member States

In the ECTEL Member States individual licences are currently granted for fixed public, public mobile, Internet Network and Services and Submarine Cable. The incumbent Cable & Wireless remains the sole provider of fixed public services in all ECTEL States except Dominica where Cable & Wireless faces limited competition from Marpin Telecoms and Broadcasting which has about 3% market share. The mobile market has attracted new entrants in all Member States. At present there are two operators in Grenada, Saint Lucia and St Vincent and the Grenadines and three operators in Dominica and St Kitts and Nevis. In the case of Internet Network and Services, Cable & Wireless is the sole provider in Grenada and Saint Lucia but faces competition from cable companies

providing broadband access in Dominica, St Kitts and Nevis and to a lesser extent in St Vincent and the Grenadines. The rates for Fixed and Internet and Network Services provided by the incumbent are regulated under a Price Cap Plan while the rates for mobile and international services are unregulated

Mobile Services

This market has been very attractive to new entrants. There are two significant provides in all markets and three in Dominica and St Kitts and Nevis. This market is considered quite competitive by providers and mobile penetration has soared from 9% to 77% since the sector was opened to competition. However there has been little price reduction between 2002 and the present[1]. The main competition appears to be in areas of promotional campaigns using SMS and free airtime. Table 1 presents the rates from mobile providers in St Vincent and the Grenadines.

Table 1: Mobile rates in St Vincent and the Grenadines

Year	**2003**			**2006**		
Type of Call	M - M	M - F	M - I	M - M	M - F	M - I
Cable & Wireless	0.79 /0.99	0.79	1.65	0.70 /0.85	0.80	1.65
Digicel	0.75 /0.85	0.80	1.30	0.75 /0.85	0.85	1.30

N.B. M – M rate in format on-net/off-net

International Service

International services are offered by holders of fixed public and public mobile licences. At March 2006, 50.6% of international traffic originated from a mobile phone. Competitive forces have resulted in fairly significant price reductions for international services, as a direct response to new entrants, the incumbent reduced fixed to international rates by 50% in 2002 and there have been further price reductions since liberalization. In 2005 the rates for fixed to international calls was reduced a further 45% in some Member States. In addition taking advantage of emerging technologies in 2005 the incumbent introduced a flat rate service (Netspeak) using VoIP technology.

Internet Access

Competitive pressures in St Kitts and Nevis and Dominica have led to significant reductions in the price for Internet access, while in St Lucia, Grenada and even St Vincent and the Grenadines prices have remained relatively flat. Table 2 presents the rates for Internet access in three ECTEL Member States.

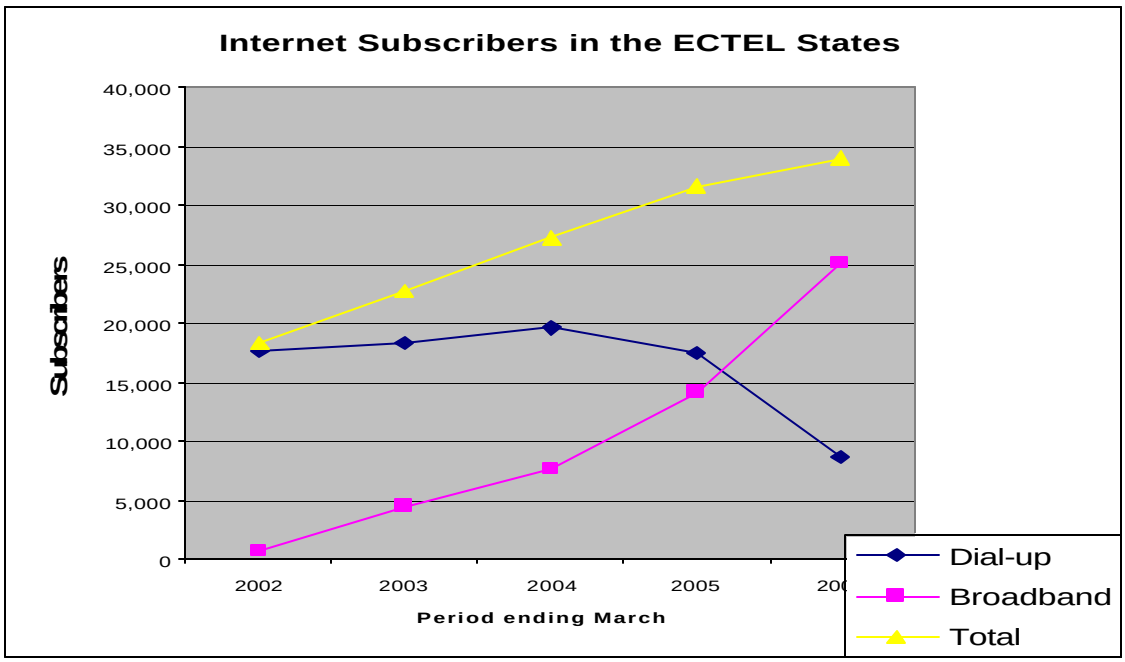
Table 2: Rates for Internet Access in Dominica, St Kitts and Nevis and Saint Lucia

State	**St Kitts and Nevis**		**Dominica**		**Saint Lucia**	
Year	*2003*	*2006*	*2003*	*2006*	*2003*	*2006*
Unlimited Dial-up	$75	$75	$69	$69	$129	$129
256Kbps	$199	$99 (512Kbps)	$249	$129	$249	$149

[1] Mobile termination may also be a factor in mobile to mobile rates.

Since liberalization there has been evidence of a shift away from dial-up to broadband access. While Internet subscription grew 85% over the past five years, broadband subscribers grew more than 3500% over the same period. Figure 1 below presents the Internet subscription in the ECTEL Member States since liberalization.

Figure 1: Internet Subscription in the ECTEL Member States



Emerging Technologies and the Market

The rate of technological change in the telecommunications sector has increase exponentially in the past few years. There has been a dramatic shift away from demand for basic voice services to a demand for a portfolio of communications services including basic voice, mobile and broadband services.

At present fixed services are mainly being offered using the PSTN and mobile services using GSM technology. Internet access is offered mainly via dial-up or ADSL using the incumbents fixed network. There has however been a move by firms in the ECTEL Member states to take advantage of emerging technologies and convergence to offer more efficient and integrated services to consumers. A number of cable companies are using their infrastructure to offer broadband Internet access and it is expected that voice services using VoIP will follow soon. The incumbent already offers high speed wireless Internet access using Wi-Fi technology and has launched a flat rate international voice service (Netspeak) using VoIP technology.

In this changing environment, the emerging technologies and convergence that will have an impact on traditional wireline telecommunications and regulation of the telecom sector include:

- Next Generation networks and telecommunications convergence
- Fixed Mobile Convergence
- Fixed Wireless Services
- The triple play from cable companies and
- Technological convergence

Next Generation Networks and Telecommunications Convergence

The ITU-T defines a NGN as a packet-based network able to provide services including Telecommunication Services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It offers unrestricted access by users to different service providers. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users. NGNs support all types of services including voice, data, video, multimedia, advanced broadband and management applications over the packet-based transport network and therefore promote telecommunications convergence. Telecommunications convergence has been fuelled by the use of the Internet Protocol (IP) standard and technologies such as Voice over Internet Protocol (VoIP).

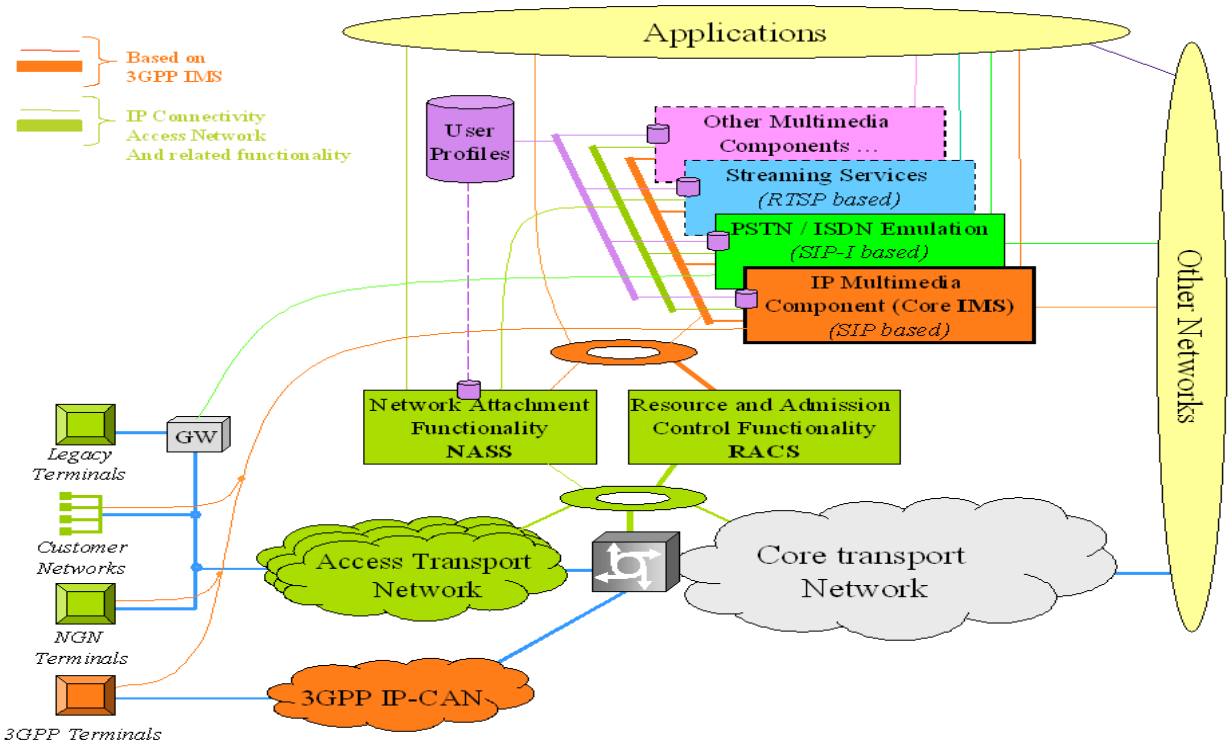


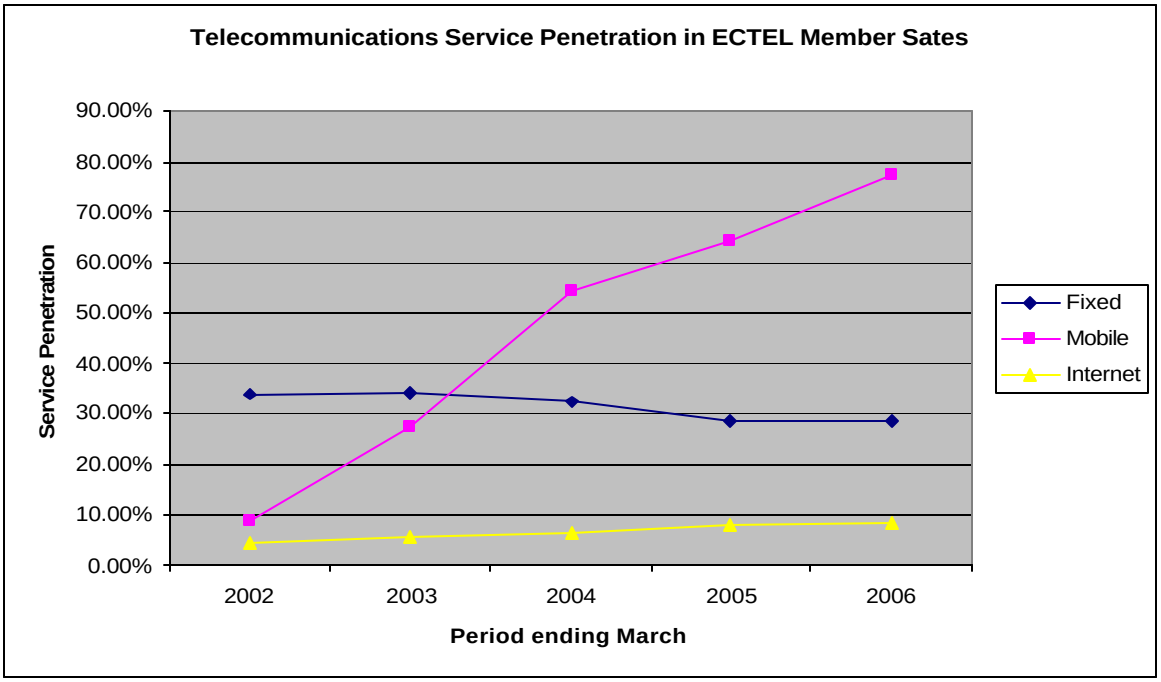
Figure 2: NGN Architecture
Source http://www.ngnsp.com/architecture/

Fixed to Mobile Convergence

Fixed-mobile convergence (FMC) is the integration of wireline and wireless technologies and services to create a single telecommunications network. FMC is driven mainly by the universal migration to an all-IP network, in which many of the core subsystems are identical across the boundary between fixed and mobile networks. FMC promises to eliminate some of the physical barriers that now prevent telecom service providers from reaching all of their potential customers with all types of services. With FMC, wireline service providers may no longer be tethered to landline networks, while wireless network operators will be able to use the most robust network resources available to meet growing demand from mobile subscribers.

Consumers have indicated some willingness to switch to wireless as telecommunications service and usage patterns have been shifting for some time with an increasing percentage of residential and business users switching voice calls to mobile networks. The ITU's World Telecommunications/ICT Development Report 2006 noted that over the period 1994 to 2004 that while fixed line networks grew globally an average of 5.1%, in several countries the number of fixed lines actually fell. Mobile telephony on the other hand has shown phenomenal growth and since 2002 the number of mobile subscribers has been more than fixed line subscribers. The ECTEL Member States have also has a similar experience. Figure 3 shows the growth in fixed, mobile and Internet penetration in the ECTEL Member States.

Figure 3: Telecommunications Service Penetration in the ECTEL Member States



Source: ECTEL / operators

Note: Includes estimates where ECTEL did not receive data from operators

Fixed Wireless Services

Fixed wireless services can be offered using Wi-Fi or WiMAX standards. Wi-Fi is primary used to create a Local Area Network which allows users within the network to connect wirelessly from up to 300ft way. Wi-Fi makes connecting to the Internet within a home or business cheap and easy. WiMAX provides wireless reception over significantly greater distances (up to 30ft) and at higher broadband levels could expand the potential of wireless penetration. WiMAX promises a solution to the last mile problem by allowing the operator access to individual homes without use of the incumbent's fixed line infrastructure. However, while Wi-Fi is widely used, WiMAX is still in its infancy.

Fixed wireless using Wi-Fi and WiMAX standards was initially introduced for broadband service. However increasing opportunities exist to offer a bundled voice and data service over fixed wireless using appropriately enabled handsets. In February 2006 an Austrian firm, WiMAX Telecom Group, announced that it was the first company to offer telephony over WiMAX stating that is was the cheapest comprehensive last mile connectivity solution. Figure 4 below presents the typical WiMAX network design.

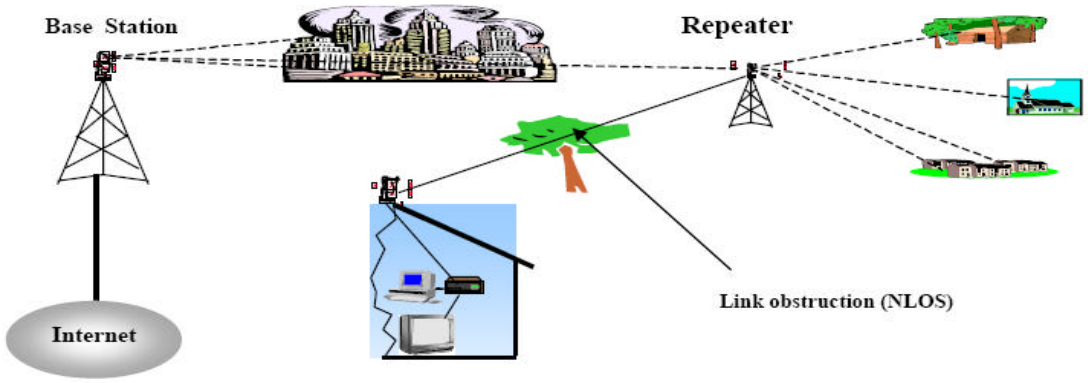


Figure 4: Typical WiMAX Network Design
Source http://www.e-nc.org/pdf/Wi-Fi__WiMAX_Primer.pdf

Fixed wireless technology is already with us in the Caribbean. Wi-Fi hot spots are common in hotel, airports and other public locations. The Barbados Advocate reported on March 2, 2006 that after a successful three-month WiMax pilot programme in the Cayman Islands, Digicel announced it would roll out the service in other Caribbean countries, including Barbados and Jamaica. The government of Barbados has also issued licences in 2004 for fixed wireless services to three other firms, TeleBarbados, WISCOM Technologies, and Last Mile Holdings. In the ECTEL Member States several firms have submitted applications for fixed public and Internet network and services licences and indicated that the service would be offered using WiMAX technology.

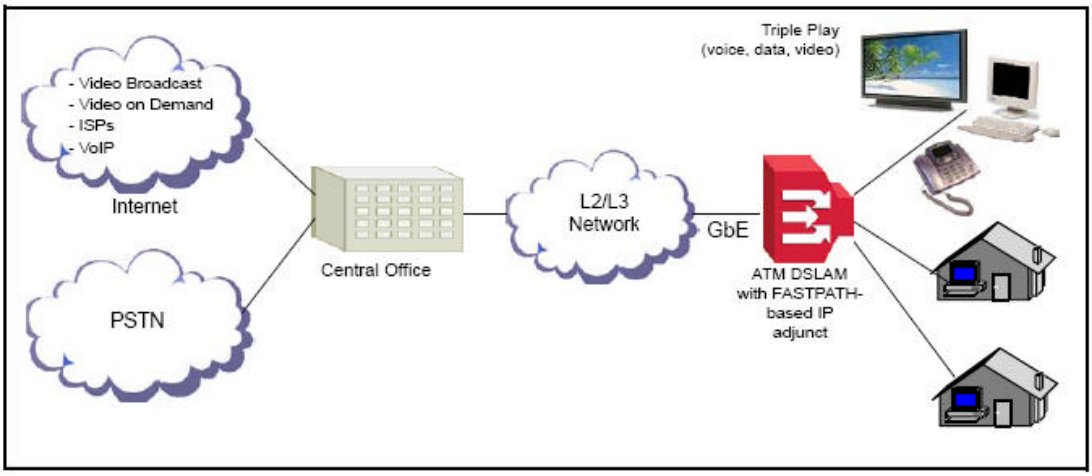
The Triple Play

The Triple Play service is a term used for the provisioning of the three services; high-speed Internet, television and voice service over a single broadband connection. Triple Play focuses on a combined business model as in this era of convergence; bundled services are proving more desirable among consumers and businesses for communication needs.

In the United States cable companies have gained considerable ground in the provision of broadband Internet access and voice telephony using their cable networks. According to a 2006 Standard and Poor's Ratings Service report cable operators now own 55% of the US broadband market and some companies such as Cablevision Systems Corp have achieved in excess of 30% phone penetration of their subscriber base.

Traditional telecommunication operators like AT&T and Verizon have also taking advantage of this opportunity building out fibre to the home (FTTH) or fibre to the business (FTTB) to offer even greater bandwidth and video services to their customers.

The developing world is also taking advantage of this opportunity, Chile was the first Latin American country to witness the deployment of triple play solutions and last year the cable company, Intercable, introduced this service to Venezuela. Marpin Telecoms and Broadcasting in Dominica offers this service but the cable companies in the other Member States have been slow to move into the telecom sector.



Last Mile DSLAM-Based Residential Triple Play Solution

Figure 5

Source http://www.lvl7.com/library/Telecom_Applications_WhitePaper_8_29.pdf

Convergence of Telecommunications and Broadcasting

Technological convergence is the trend within the communications media where through the application of digitalization and other technologies, all forms of media are now being offered on single integrated platforms. We now have newspapers and radio on the Internet, Personal Digital Assistants (PDAs) with in-depth reports from news houses and phones with regular update from media sources.

Regulatory Challenges and Responses to Integration and Convergence

In the fast paced world of emerging technologies and convergence of telecommunications and broadcasting, operators in the telecommunications sector must adopt or die. It will not be sufficient for traditional operators to simply offer wholesale 'pipe' based services. These operators must also offer value-added services to remain competitive, or risk losing lucrative customers to more innovative firms offering a suite of communications services.

In this environment the regulatory framework must be prepared to move swiftly to remain relevant. Integration and convergence means that competition analysis as we know it today may be inadequate to handle firms operating in an environment where no longer are there telephone, cable TV, Internet Service Providers and Broadcasting firms in separate distinct markets but communications companies in the same market all vying for the same customers.

Challenge to Regulators

The authors of a 2005 report[2] notes that the rapid rate of change in technologies, markets and services being stimulated by IP convergence has created a major problem for policymakers and regulators. Many established policies and regulations have become obsolete and now provide inefficient and increasingly untenable restrictions and barriers to the development and dissemination of the benefits of IP convergence. This means that Policymakers and regulators must develop an appropriate policy and regulatory framework that will facilitate the realization of the full benefits of IP convergence in network and services development and the achievement of public interest goals.

Market Definition

The primary challenges in facilitating IP convergence relate to establishing a market environment that is open to new networks, new services and new applications. This involves encouraging rather than resisting the erosion of barriers and artificial distinctions among technologies, services and markets. It is necessary to prevent monopoly practices that restrict opportunities and to ensure that the regulatory process does not become a barrier to participation by new players who will help drive market development. To do this in a dynamic market capable of continuing innovation, regulators will need powers that give them flexibility to match regulatory standards and tools to a changing market environment, including the option to forbear from regulation where market circumstances justify it. In developing and emerging economies without well established competition authorities increased powers for telecom regulators may be necessary.

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[2] Melody, W., Sutherland, E., Tadayoni, Reza. (2005). *Convergence, IP Telephony and Telecom Regulation: Challenges and Opportunities for Network Development, with particular reference to India*.

Licensing
The licensing of telecommunications operators and service providers has an effective instrument in the liberalization of the sector. However the new market environment requires the reassessment of the purposes and practices of licensing. The traditional approach of licensing specific technologies or services is inappropriate in the new market environment.

Network Interconnection and Access
Efficient interconnection is critical for effective competition in the telecommunications sector. The requirement for cost-based interconnection, imposed on monopolists, has provided a satisfactory framework for competition in the liberalized telecom sector. However, the traditional units of measurement, used for calculating traffic and usage for interconnection and network access, minutes, miles and circuits are rendered obsolete by IP convergence. Interconnection and access arrangements will have to be renegotiated in the new environment. More players are expected in the market but asymmetric bargaining power is still anticipated.

Revenue Settlement
VOIP may provide the final blow that will terminate international revenue settlement arrangements allowing companies to charge monopoly prices for international calls. New pricing structures for international services will have to be developed and new business models adopted.

Price Regulation
Regulators have used rate of return and price caps to regulate prices for operators with a monopoly or dominant position. In the changing market regulators will need to focus more attention in identifying specific monopoly nodes in the network as more players are able to enter the market. Only prices for monopoly nodes in the network and basic service prices for end users served by a monopoly should be regulated.

Other regulatory issues that will remain high priorities in the convergence transition environment include:

- Effective management of public resources such as rights of way, spectrum, numbers and domain names;
- portability of numbers, names and addresses; and
- universal service in an environment where the number of ways of providing universal service and the number of participants who can contribute to it has increased substantially.

Regulatory Responses
A number of countries have responded to the challenges of emerging technologies and convergence in a number of ways including:

- *Revision of regulatory framework*
    - The European Commission developed a new regulatory framework comprising five Directives for the regulation of electronic communications.

The Common Regularity Framework Directive[3] promotes the establishment of new regulations that manage fixed, mobile, Cable TV, Internet access and other communications services under the framework of electronic communications. This new regulatory framework is wide viewed as the most focused approach to dealing with convergence issues.

- The Office of the Telecommunications Authority (OFTA) of Hong Kong is also actively consulting on changes necessary to ensure that the regulatory framework remains conducive to emerging technologies like FMC and wireless services including broadband wireless access. Several other regulator including Telecom Regulatory Authority of India (TRAI) are also actively reviewing framework to deal with emerging technologies and convergence.

- *The Creation of a super regulator with responsibility for all electronic communications.*
  Within Europe, the United Kingdom is widely noted as the most progressive in terms of telecommunications regulations. The UK has responded to convergence and changes in the competitive landscape with the establishment of Ofcom a 'super regulator' that inherited the duties that had previously been the responsibility of five regulatory bodies:
  - The Broadcasting Standards Commission
  - The Independent Television Commission
  - The Office of Telecommunications
  - The Radio Authority
  - The Radiocommunications Agency

There are several advantages to the super regulator including economies of scope and scale. However the regulation of different communication and media areas cannot be achieved by simply joining together organizations and expecting synergies to develop from the mere organizational unification process. It must be clearly determined how the different functions relate to one another. A type of matrix structure may be necessary as a possible solution for reaping the 'scope advantages' and for avoiding the development of a disjunctive organization.

[3] In the Framework Directive (2002/21/EC) the Commission notes that "It is necessary to separate the regulation of transmission from the regulation of content. This framework does not therefore cover the content of services delivered over electronic communications networks using electronic communications services, such as broadcasting content, financial services and certain information society services,...

The ECTEL Experience

The current legal and regulatory framework provides for the regulation of fixed telephony, mobile telephony and internet access as separate distinct services. An operator must therefore apply for two licences if it wants to provide fixed and Internet services though using the same platform. This approach is not sustainable in an environment of today's emerging technologies and convergence. Over the past six months a number of firms have indicated their intension to launch NGNs, a number cable companies have sort licences for the provision of fixed voice and Internet services and existing firma and potential new entrants have submitted applications for fixed services indicating that wireless technologies will be deployed. To address the regulatory changes necessitated by convergence, ECTEL is currently consulting with stakeholder and the general public.

Conclusion

As existing firms increase their portfolio of services and new entrants enter the market it is expected that competition will intensify in all retail markets including local fixed services. It was once thought that local fixed market would prove unattractive due to high barriers to entry, however the emergence of fixed wireless technologies promises new entrants a cost effective method of accessing the "last mile".

Intense competition and innovation with convergence, integration and emerging technology will no doubt prove be a bonanza for consumers. It also poses a significant challenge to regulators to stay nimble in a fast moving environment and develop tools to foster competition while not imposing onerous obligation on dominant operators. Regulators all face the same basic challenges. However, each country will need to adapt in response to emerging technologies and convergence based on the particular circumstances of that country as new technology threatens the traditional telecommunications network design and operations, service offering, business models, policies and regulations.

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