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Council for Trade in Services

TELECOMMUNICATION SERVICES

Background Note by the Secretariat[1]

1. This Note has been prepared at the request of the Council for Trade in Services, with a view to stimulating discussions in the Council on the telecommunication sector. It provides background information and updates a previous Note on trade in telecommunication services (S/C/W/74, dated 8 December 1998). This Note focuses on developments and issues considered to be most relevant to the GATS. It is not intended to provide a comprehensive account of the sector. The Secretariat would point out that many of the observations contained in the previous Note remain pertinent today and that this Note will not, for the most part, repeat all of those same points. Instead, it will highlight new data and emerging features in the areas of commercial and technological developments and regulatory matters. Following the introduction, Part II deals with the definition of the sector, Part III with its economic importance, Part IV provides an analysis of GATS commitments, and Part V outlines the trade and regulatory environment.

I. INTRODUCTION

2. It is fair to say that telecommunications has not only undergone a revolution in the past decade, but that it has also revolutionized communicating and the way the global economy functions. The first wave of change, the transition from monopoly to competitive market structures, marked by the WTO negotiations on basic telecommunications (1994-1997), became the driving force of subsequent developments. Today, only about 30 per cent of governments worldwide retain a monopoly on fixed telephony and only 10 per cent maintain monopoly supply of mobile services or Internet. As a result of increased competition, telecommunications (fixed or mobile) are now available to nearly 70 per cent of the world's population, almost triple the level in 2000. Moreover, prices of many services have plummeted. Since 1998, telephony prices in industrialized economies fell by an average of 50 per cent, and the price drops in liberalized developing and transition economies were even more dramatic. In 2008, for example, ICT tariffs in more than 70 developing economies were on par with those charged in industrialized countries, and the tariffs of about 40 of those economies fell in the lowest ranges.[2] The second wave of change was the rise of commercial Internet and mobile services. Globally, in 2007 the total number of Internet users (1.34 billion) exceeded for the first time the number of fixed line subscribers (1.28 billion), and mobile service now accounts for 72 per cent of all telephones in use. A result of the increased teledensity is, as one observer notes, that universal service is largely becoming a *de facto* state of the market, not a regulated condition of operation. The evidence is clear that effective universal service is more likely to be achieved through raw competition.[3]

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[1] This document has been prepared under the Secretariat's own responsibility and without prejudice to the positions of Members and to their rights and obligations under the WTO.

[2] Price baskets composed of fixed, mobile and broadband services were constructed for a recent ITU study, *Measuring the Information Society: The ICT Development Index*, © ITU 2009, Geneva.

[3] Blackman, C., "Public interest and the future telecommunications landscape", *INFO*, Vol. 9 No. 2, 2007.

3. The transformation continues with the introduction of so-called next generation fixed networks (NGN), based to a large extent on Internet protocols (IP), and broadband, high-capacity access, both fixed and mobile. NGNs have the potential to reduce dramatically the underlying cost of physical networks while at the same time increasing the variety and sophistication of services that can be offered. By 2007, broadband access had reached over 5 per cent of the world's inhabitants, compared with only 1 per cent five years earlier. Broadband technologies put an extraordinary and growing array of information and multimedia products within the reach of ordinary users and businesses.

4. These developments also spur convergence, both technological and commercial, a phenomenon that makes telecommunications even more essential as a means of delivery than in the past. The revolution has not only linked societies and cultures, extending and diversifying their exposure; it has also changed the way firms do business and the way many goods and services are traded. Buying, selling and logistics management have been streamlined and globalised by telecommunications. Vast strides have been made in the outsourcing of business opportunities to developing countries.[4] These services, that once required costly satellite links, have been made economically more feasible by Internet and associated applications that allow call centres, for example, to function as if they were in close proximity to the customers and companies served. Electronic commerce and other forms of cross-border supply have also been energised by more sophisticated, lower cost communications. It is a matter of course, today, for businesses everywhere to maintain websites, and in many cases allow the purchase and/or delivery of their products on-line and, increasingly, via mobile handsets. In some cases, contrary to historical trends, developing countries are among the first to adopt more widely the new technologies; mobile banking is one example. Finally, e-government initiatives have improved and streamlined services to citizens and, at the same time, enhanced trade facilitation and the interface with businesses. In many countries today, businesses at home and abroad may verify regulatory information, apply for licenses and conduct a variety of registration and certification procedures on-line.

5. Communications and IT services have become widely seen as an engine for development and an indispensable tool for economic growth. According to a recent report, digital, increasingly converged, and broadband platforms have a transformational impact on economic development.[5] While a gap remains between developed and developing countries regarding levels of access, the transformation of the telecommunication sector has not entirely left the developing world behind. Mobile telephony, in particular, witnessed exponential growth in developing countries, once governments issued more mobile licenses and the operators introduced prepaid payment options, making the service accessible to low income users. In Africa, for example, penetration remains low, but mobile growth rates remain the highest in the world at over 30 per cent in 2006/07. The authors of a recently published book on global communications observe that for once, the transformation ... is not just a tale of the prosperous states doing better. These changes boosted the economic takeoff of India and China and other emerging powers, and also brought a much greater level of digital connectivity to the poor than anyone dreamed of in the late 1980s.[6] A recent study on mobile telecommunications in Pakistan offers evidence that a pro-competition policy may be imperative for

[4] See also, e.g., presentations on outsourcing, computer services and e-agriculture made at the WTO Symposium on the 10th Anniversary of the Negotiations on Basic Telecommunications, 20-21 February 2008.

[5] Locksley, G., "The Media and Development: What's the Story?", World Bank Working Paper No. 158, 2009, p. 9.

[6] Cowhey, P.F., and Aronson, J. D., *Transforming Global Information and Communications Markets*, © 2009, MIT Press.

mobile development in developing countries and, also, that an independent regulator is critical in promoting technological innovation.[7]

6. Possible effects of the economic downturn which began in 2008 are at present difficult to pin down, since related data may only be starting to emerge. In some cases, telecom revenues are beginning to see slight reductions. In other cases, such as mobile services in developing countries, growth is being maintained but at reduced rates. Initial indications appear to illustrate that the sector is more resilient than many others. Communications experts predict that telecommunications and IT technologies will also play a role in cushioning other economic sectors from the full thrust of the downturn.[8] For example, by resorting to more intensive use of communications technologies firms are able to effect cost savings and further increase efficiency at a time when such strategies are more critical than ever.

II. DEFINITION OF THE SECTOR

7. Telecommunications is broadly defined in the GATS Annex on Telecommunications (the Annex) as "the transmission and reception of signals by any electromagnetic means." The GATS Services Sectoral Classification List[9] breaks down telecommunications into 14 sub-sectors (a. - n.) and an "other" category (paragraph o.) (see Appendix Figure A2. This classification scheme is supplemented and further refined by the *Notes on Scheduling Basic Telecoms Commitments* that emerged from the WTO negotiations on basic telecommunications.[10] Services commonly known as "basic" telecommunications are formally referred to in the Annex as "public telecommunications transport networks and services" (PTTNS) and are defined therein (see Appendix Figure A3. The term PTTNS was drawn upon by Ministers to define the scope of the post-Uruguay Round negotiations on telecommunications.[11] On the basis of the Annex definition of PTTNS, sub-sectors a. through g. of the GATS classification list, as well as a variety of "other" services that provide real-time transmission of customer supplied information are generally considered to be basic telecommunication services. Services not falling within the Annex definition of PTTNS, such as subsectors h. through n. and any "other" services, not supplied on a real-time basis or which transform the form or content of customer's information, are generally referred to as "value-added" telecommunication services.[12]

8. In liberalized markets, a distinction between basic and value-added services may have considerably less importance than in the past. Nonetheless, in some regimes distinguishing between the two types of services remains relevant to the implementation of certain public or universal service objectives, licensing requirements or regulatory obligations. In addition, the distinction is largely irrelevant for the purpose of the Doha Development Agenda, in which the entire gamut of

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[7] Ping, Gao and Rafiq, Adnan, "The transformation of the mobile telecommunications industry in Pakistan: A developing country perspective", *Telecommunications Policy*, Vol. 33, No. 5-6, (June-July 2009).

[8] See, e.g., *Confronting the Crisis: Its Impact on the ICT Industry*, ITU, February 2009 and conference proceedings of the ITU's Strategic Dialogue on ICTs, 21 April 2009.

[9] MTN.GNS/W/120, 10 July 1991.

[10] Note by the Chairman, Group on Basic Telecommunications, S/GBT/W/2/Rev.1, 16 January 1997.

[11] Ministerial Decision on Negotiations on Basic Telecommunications, Marrakech Ministerial, April 1994**.** Ministers dropped, however, the reference to "public" so that negotiations could encompass both public and non-public basic services (i.e. those not subject to public service obligations).

[12] It is in this sense that references to basic and value-added services will be used in this Note. It is recognized, however, that this breakdown does not necessarily reflect and does not need to correspond to any particular government's national classification of services as basic or value added. For example, it is not uncommon for mobile telephony, paging, or data transmission (which supply customers' information on a real-time basis) to be designated as value-added services in national regimes. Often, the designations were used to indicate which services were under monopoly purview (i.e. basic) and those which were not (i.e. value-added) within national regulations.

telecommunication services is under negotiation. Within the GATS however, the distinction between basic and value-added telecommunications remains relevant to the application of the Annex on Telecommunications and the Reference Paper. In these texts, the term PTTNS is employed to define the scope of services and services suppliers to which governments are obliged to apply certain of the disciplines.

9. Over the last decade, the distinction not only between basic and value-added services, but also between telecommunications and other GATS sectors and subsectors, has become blurred with the adoption of full liberalization of services and the introduction of new transmission technologies. Both of these factors have enabled suppliers to integrate different telecommunications services, as well as a variety of computer and audiovisual services and technologies into seamless offerings to customers. A degree of uncertainty in classification and scheduling may sometimes result, therefore, from the convergence of broadcast, telecommunications, and computer technologies. For example, as it has become common commercial practice for a great many computer and related services to be supplied on-line, a distinction between value-added telecommunications and such services is increasingly difficult to draw.

10. Rapid transformations in the sector mean not only that the existing GATS classification of telecommunications services may be inadequate, but also that any other list that might be devised could become quickly obsolete. In this environment, the use of the Chairman's Note on scheduling commitments,[13] elaborated during the negotiations on basic telecommunications, continues to be of assistance in defining the nature and scope of telecom services committed (see Appendix figure 1D). The categories of service suggested by the Chairman's Note lend flexibility to the GATS classification scheme. The categories draw upon four types of distinctions: a) geographic - local, domestic long distance, and international; b) means of technology - wire-based and wireless (or radio-based); c) means of delivery - facilities-based or on a resale basis (i.e. non-facilities based); and d) clientele - for public use, for non-public use (e.g. services sold within niche markets or to closed user groups). For partially liberalized regimes, the clarity of commitments is enhanced by the use of the categories. For commitments on fully liberalized regimes or services, it is only by reference to the Note that the *absence* of category indications can be clearly understood to mean that the commitment encompasses all of the indicated categories of service, since, in the schedule itself, critical information on the scope of commitments is often implicit. Bearing this in mind, some governments have included text drawn from the Chairman's note in the header of the sector/subsector column of their schedules. Others, such as governments that acceded to WTO over the past decade, cite the Chairman's Note in the header to the telecom section of the schedule.

11. The Chairman's Note is perhaps less useful in dealing with issues of convergence across sectors, which it does not address. In this regard, definitional problems remain. An interesting anomaly is, for example, that the "on-line information and/or data processing" subsector in the GATS classification list is assigned the same CPC classification code as the data processing services subsector listed in the GATS classification for computer services. In general, however, a key distinction to bear in mind is that between *use* and *supply*, wherein telecommunications may be used as a "means of delivery" for many other services. Suppliers of such services as computer services, audiovisual services and other communications-enabled services, classified elsewhere in the GATS list, are common examples of *users* of telecommunications networks and services. Alternatively, if a supplier of services other than telecommunications were, at the same time, to own or operate its own networks, a prospect made possible by telecom liberalization, then the supplier would presumably be supplying both telecommunications as well as the overlying services. In such a case, more than one sector in a schedule would be relevant to the supplier's GATS benefits and entitlements.

[13] S/GBT/W/2/Rev.1, 16 January 1997.

III. ECONOMIC AND TRADE PROFILE

12. Global revenue for telecommunications services stood at US$1.4 trillion in 2005, the most recent year for which comprehensive data is available.[14] This figure comprises US$579 billion in mobile services. As a result of tariff reductions, international services now account for a smaller proportion of total telecommunications revenue than in the past. Measured in minutes, however, international traffic more than doubled in a decade, from 81 billion in 1997 to 183 billion in 2006.[15]

13. As shown in Table 1, main lines (fixed subscribers) totalled nearly 1.3 million in 2007, while cellular service accounted for nearly 3.5 million subscribers. Growth rates in fixed service have been sustained in Africa and Asia, at 6.1 per cent and 7.8 per cent average annual rates, respectively, over 2002-2007. However, fixed line growth remained stagnant in much of the rest of the world. Dramatic uptake in cellular service is evident in an average global subscriber growth rate of nearly 24 per cent per year between 2002-2007. Total global teledensity (fixed telephone lines plus mobile cellular subscriptions per 100 inhabitants) reached close to 70 per cent in 2007. Only the African continent, with a teledensity of about 31 per cent, falls below the rates that were at one time only achieved by industrialized economies. Figure 1 shows global penetration rates for different types of telecommunications services over the 1998 and 2007 period.

Table 1. World telecommunications network development: Fixed and cellular

	Main lines 1997 (m)	Main lines 2007 (m)	CAGR 2002-2007 %	Cellular subscriptions 1997 (m)	Cellular subscriptions 2007 (m)	CAGR 2002-2007 %	2007 Total (ML + CS)/ 100 inhab.
Africa	15	31	6.1	2	275	49.0	31.05
Americas	246	279	-1.4	72	667	21.1	103.80
Asia	235	624	7.8	74	1,514	27.8	53.74
Europe	285	327	0.2	61	897	17.0	151.62
Oceania	12	12	-1.0	5	27	11.8	114.38
WORLD	**793**	**1,272**	**3.2**	**214**	**3,380**	**23.8**	**69.45**

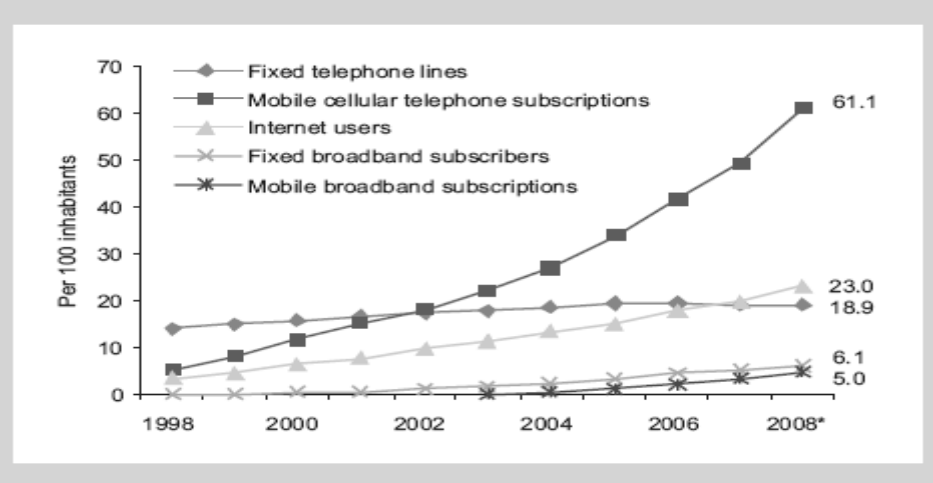
Source: ITU World Telecommunication/ICT Indicators Database

14. Regarding capital expenditure and investment, trends are also positive. ITU data show capital expenditure in the sector for 2006 at US$204 billion (a figure that, according to ITU, may not fully encompass expenditures by new entrants.). OECD figures for 2005 show telecommunications investment (a broader measure than capital expenditure) at US$157 billion, with incumbents accounting for 73 per cent of the total.[16] The OECD result remains lower than the peak during the dotcom bubble in 2000, but represents growth over the 2003 and 2004 investment levels. According to an UNCTAD report, the share of foreign investors in total telecommunications investment commitments over 1996-2006 exceeded 40 per cent in all developing and transition country regions

[14] ITU World Telecommunication/ICT Indicators Database.
[15] ITU World Telecommunication/ICT Indicators Database.
[16] The report, *The Influence of Market Developments and Policies on Telecommunications Investment*, DSTI/ICCP/CISP(2007)6/FINAL, OECD, 2009, also acknowledges the difficulty in fully accounting for investment effected by new entrant companies.

except Asia. This proportion was higher than in any other infrastructure sector examined by the report.[17]

Figure 1 Global growth in teledensity, by types of services, 1998-2008



Source: ITU, *Measuring the Information Society*, 2009 and the ITU World Telecommunication/ ICT Indicators Database

15. Growth and higher teledensity in telecommunications is projected to have significant multiplier effects on the economies concerned. According to a recent study of the impact of mobile services on several economies, a resulting increase in GDP due to raised productivity ranged from 0.8 per cent in Thailand to 2.1 per cent in Bangladesh, where mobile telephony was often a substitute for fixed, and a large proportion of subscribers used their mobile phone for business purposes. The actual contribution to GDP was thought to be higher, since the figures do not take into account les tangible effects such as the dissemination of educational and health information, and the availability of mobile remittance services. The study also found the employment impact to be significant. It estimated that the total of direct, indirect and multiplier effects on employments ranged from 36,000 jobs (full-time equivalent) in Serbia to as many as 244,000 jobs in Pakistan in 2007.[18] Other studies based on emerging data have generally confirmed a link of the sector to growth and income related benefits.[19]

16. The cost of telecommunications has also plummeted as competition has taken hold. International call prices, according to Telegeography, have declined every year since it first begun publishing its flagship report in 1988. Over 15 years, world average prices for an international call fell more than 80 per cent, and declined an additional 7 per cent in 2007. In spite of lower prices, subsequent to revenue declines recorded between 2002-2004, international call revenues have resumed upward movement since 2006, totalling US$78 billion in 2007.[20] Domestic tariffs have also

[17] *World Investment Report, Part II: Transnational Corporations and the Infrastructure Challenge.* UNCTAD, 2008, pp. 19-20.

[18] Deloitte & Touche, *Economic Impact of Mobile Communications on Serbia, Ukraine, Malaysia, Thailand, Bangladesh and Pakistan*, Report prepared for Telenor ASA, January 2008.

[19] See, e.g. Bhavnani, A.; R. Won-Wai Chiu; S. Janakiram; and P. Silarszky, The Role of Mobile Phones in Sustainable Rural Poverty Reduction, The World Bank, GICT Department, June 2008; Urquhart, C, S. Liyanage, and M. Mo Kahl, "ICTs and poverty reduction: a social capital and knowledge perspective," *Journal of Information Technology* (2008) 23, pp. 208-213; and Keck, A. and C. Djiofack-Zebaze, "Telecommunications Services in Africa: The Impact of Multilateral Commitments and Unilateral Reform on Sector Performance and Economic Growth", WTO Staff Working Paper, November 2006.

[20] *Telegeography Report*, © 2008 Primetrica, Inc.

contributed to the trend in affordability. In Mauritius, for example, the cost of a three minute call to Longdon fell by 84 per cent and a call to China by 89 per cent between 2001 and 2008.[21] In Pakistan, monthly mobile phone tariffs plummeted from 253 per cent of monthly per capita income in 2000 to 3 per cent of monthly per capita income in 2006, and the mobile sector has been considered to be a factor in driving economic growth.[22] In 2009, ITU launched am ICT Price Basket, which combines fixed, mobile and broadband tariffs into one measure and compares it across countries. The ICT Price Basket will be published annually and will for the first time allow comparisons over time for a wide range of developed and developing economies. In the OECD, which has been examining baskets of prices for some time, a trend observed in OECD economies is a shift away from paying for voice to paying for data, which can also be used to transport voice. Such pricing practices involve, for example, flat-rate packages for domestic and international voice calls to fixed lines. Flat-rate pricing is also the dominant structure for broadband access in the OECD economies.[23]

17. The trend toward cross-sector convergence is evident in the continued growth of markets in which operators provide multiple-play offers (e.g. including television, Internet, voice and data). As operators in the previously distinct markets have begun to compete, cable television providers, for example, now commonly offer Internet access and voice. Similarly, mobile companies complement their subscriptions with data and video offerings, as do traditional operators over their own networks. Consumers benefit from the lowering of walls between these markets as they gain a growing number of providers among which to choose. However, the removal of technological barriers and commercial restraints between sometimes very differently regulated sectors such as audiovisual and computer services, can require governments to re-examine a number of issues.

18. Recently, a steady increase in offerings of mobile broadband service is taking hold. By 2007, the number of mobile broadband subscribers reached 266 million, a growth rate of 90 per cent over 2006.[24] A strong competitive environment and newly emerging technologies are making this possible. Such technologies include offerings such as WIFI, 2.5/3 generation mobile service and emerging 3.5/4 generation technologies (capable of carrying ever higher bandwidth), WiMAX and other new forms of high-speed packet access.

19. Markets for Voice over Internet Protocol (VoIP) have continued to grow. An advantage of VoIP telephony is that it reinforces the downward price trends that governments opening their markets seek to obtain. Increased regulatory opening to various forms of VoIP has allowed it to compete head-on with traditional telephone lines in many developed and some developing countries. Both in France[25] and Japan[26], about one-third of all fixed lines were VoIP lines at the end of 2007. (See also Appendix Figures A5 and A6.) According to some market analysts, the number of VoIP subscribers globally reached 80 million in 2008.[27] Another recent trend is that business users represent an increasing share of the subscribers.

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[21] Information and Communication Technology Authority, Government of Mauritius, *Country Report to Crasa*, April 2009.

[22] A monthly charge is compiled based on a basket of peak and off-peak and on-net, off-net and fixed calls. The basket is divided by Gross National Income per capita. See: *World Information Society Report 2007: Beyond WSIS*, ITU/UNCTAD, June 2007, pp 72-73.

[23] OECD, *Communications Outlook*, 2007.

[24] ITU World Telecommunication/ICT Indicators Database.

[25] iLocus, 5 August 2008, at: www.ilocus.com/2008/08/64_voip_subscribers_in_france.html

[26] Ovum, VoIP becoming mainstream in Korea and Japan, 21 January 2008, at: www.ovum.com/go/content/c,377,73689.

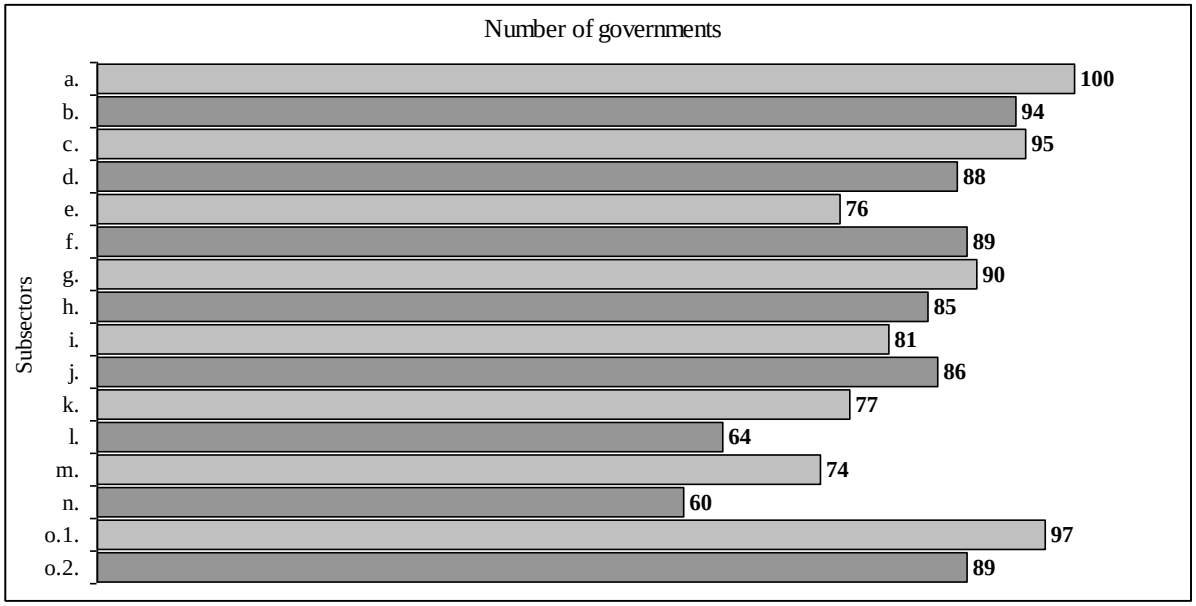
[27] Infonetics Research, through *VoIP News*, 1 March 2008, at: www.voip-news.co.uk/2008/03/01/80-million-worldwide-voip-subscribers-in-2007/.

IV. GATS COMMITMENTS

20. As of May 2009, a total of 108 governments, or more than two-thirds of all WTO Members have committed on telecommunications services in their GATS schedules. This means that telecommunications is the GATS sector with the third highest number of commitments after business and professional services and financial services. As regards scheduling of the Reference Paper on regulatory principles for telecommunications (the only service thus far with negotiated additional commitments), the number of Member governments who have attached it with few, if any, modifications now stands at 82.[28] About seven additional governments have made commitments to some, but not all, of the Reference Paper provisions, or have appended their own versions. Every government that has acceded to the WTO since the basic telecommunications negotiations has also taken on these disciplines. In the Doha Development Agenda negotiations, some governments have made offers that would commit for the first time telecommunications services and that include the disciplines in the Reference Paper.

21. More governments have typically committed on basic telecommunications services (subsectors a-g) than on value added services (subsectors h-n). Figure 2 illustrates that 100 governments committed on voice telephone services (subsector a) and 94-95 committed on data transmission services (subsectors b and c). Mobile services, often but not always committed under "other" services, are committed with respect to mobile cellular by 97 governments and mobile satellite services by 89 governments. Although many of the commitments were originally scheduled to be phased in on specified future dates, all but virtually a handful of the phase-ins have now transpired. The value-added service with the highest number of commitments is "on-line information and data base retrieval" (subsector k) in which 86 governments commit; e-mail and voice mail have commitments by 85 and 81 governments, respectively. A total of 18 of the committing governments did not list any value-added services, and another five Members only committed on one or two. This does not arise because value-added services are less open to competition. Rather, it is a legacy of the WTO negotiations dedicated to basic services. The Doha Development Agenda negotiations might possibly help contribute to rectifying this anomaly.

Figure 2. Number of commitments in telecommunications, by subsector



Subsectors Key:

[28] The figure counts EC Member states individually.

a. Voice Telephone Services,
b. Packet-Switched Data Transmission Services,
c. Circuit-Switched Data Transmission Services,
d. Telex Services,
e. Telegraph Services,
f. Facsimile Services,
g. Private Leased Circuit Services,
h. Electronic Mail,
i. Voice Mail,
j. On-line Information and Data Base Retrieval,
k. Electronic Data Interchange (EDI),
l. Enhanced/Value-Added Facsimile Services,
m. Code and Protocol Conversion,
n. On-line Information and/or data processing,
o.1. Other – Mobile Cellular
o.2. Other – Mobile Satellite

22. In terms of breadth of coverage of telecom services in commitments, the record is mixed. The services sectoral classification list contains a total of 15 subsectors into which commitments can be organized. Table 2 shows that 35 governments have committed on all subsectors and another 30 Members commit on 13 or more. Nearly three-fourths of governments with commitments list at least half of the telecom subsectors, while those listing four or less sub-sectors represent less than 4 per cent.

23. Due to the use of the Chairman's Note categories to describe the activities committed, within each subsector listed some governments may also have limited the scope of the commitment only to sub-categories such as public service or to facilities-based supply. All industrialized country governments have, for example, committed to allow non-facilities based supply (or resale) of basic voice or data services, while such commitments by developing countries vary. While a number of developing economy governments have limited their commitments on voice services to facilities based supply, others have elected to take a phased-in commitment to voice resale services.

Table 2. Coverage of Subsectors by Commitments

Number of Sub-sectors committed	**1 - 4**	**5 - 8**	**9 - 12**	**13 - 14**	**15**
Number of Governments	5	23	15	30	35
% of governments with commitments	26		41		32

24. Dealing with the limitations listed in commitments on telecommunications services has been flagged as a priority in the Doha Agenda negotiations. In Annex C of the Hong Kong Ministerial Declaration (December 2005), Ministers made a reference to the "sectoral and modal objectives as identified by Members". The objectives relating to telecommunications services called for improving the coverage of modes and subsectors, in a technology-neutral manner. They also stressed the reduction or elimination of limitations currently listed in schedules, such as exclusive rights, economic needs tests, restrictions on the type of legal entity and on foreign equity;[29] The subsequent plurilateral request on telecommunications also cited limitations such as routing and commercial presence requirements, limits on the number of suppliers, type of legal entity and economic needs tests (mode 3) as candidates for removal.

V. TRADE AND REGULATORY ENVIRONMENT

25. The global environment in which telecommunication services are traded today is predominantly a competitive one characterized by more open cross-border trade and foreign direct investment. Cross-border trade now can increasingly encompass not only the traditional cross-border

[29] Report by the Services Chairman to the Trade Negotiations Committee, TN/S/23, 28 November 2005. The objectives, as well as the plurilateral request, also called for commitment to all provisions of the Reference Paper; and the elimination of MFN exemptions.

supply of services via termination but also the uptake of new customers within foreign markets far from where the supplier is physically located. This new aspect of cross-border trade will become increasingly feasible in the future as global broadband penetration rises to significant levels. At present, nevertheless, trade in telecommunications by means of commercial presence predominates. Whether measured by BOP or international call revenues, it would appear that cross border services account for only 5-10 per cent of total telecommunication revenues.[30] However, despite a dramatic opening of markets over the past decade, incumbent operators (i.e. the former monopolies) still retain a dominant position in most economies. For this reason, the maintenance of regulatory safeguards such as those dealt with by the Annex on Telecommunications and the Reference Paper has continued to be an important feature of telecom reforms. This section provides a summary of some of the significant issues in market structure and regulatory issues.

A. COMPETITION AND MARKET STRUCTURE

26. Markets steadily continue to open to competition. While only 40 countries had authorized competition in the provision of basic telecommunication services in 1997, a decade later the number had risen to about 110 countries. According to data on OECD economies, price decreases and improved services have been most noticeable in markets characterised by intense competition.[31] Mobile services and Internet services continue to be the most competitive markets, although fixed-line services are now becoming increasingly competitive. A trend toward increased liberalization of international facilities is also evident in developing economies, especially Africa. Countries that have liberalized international gateways have seen prices fall and quality of service improved. Liberalization includes licensing or authorization of multiple players for the provision of international gateway services, and opening up cable landing stations to competition.[32]

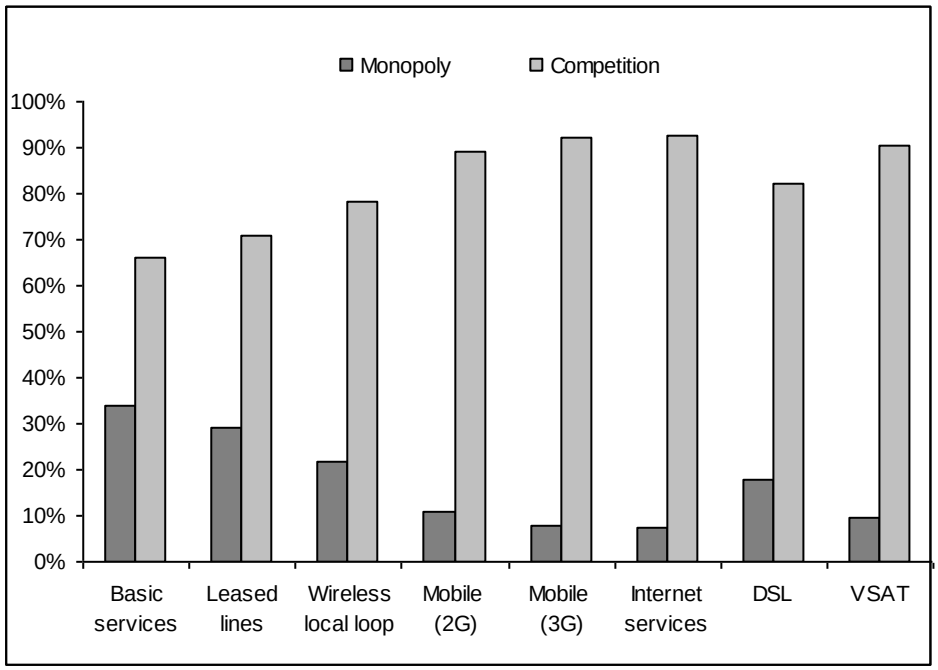
27. Data from the ITU's regulatory database (Figure 3) illustrate that only about 30 per cent of governments worldwide retained a monopoly over fixed network services in 2008. This fact likely explains the somewhat higher figures for monopoly control over wireless local loop services (which are an extension of fixed networks) and leased lines that are typically obtained from such monopolies. By contrast, around 90 per cent of governments allowed competition in mobile services (2G and 3G) and Internet access services, a factor that is considered to be largely responsible for the phenomenal growth in uptake of these services. The ITU database also shows VSAT services (a service not usually broken out in GATS commitments due to the technology neutral approach to scheduling) as having been opened to competition by nearly 90 per cent of governments.

[30] Neither BOP statistics nor international call revenues are comprehensive measures of actual cross border supply of telecommunications services, which are in all services difficult to measure. As such, they should only be considered indicative.

[31] OECD, *Communications Outlook*, 2007.

[32] ITU, *Trends in Telecommunications Reform*, 2008.

Figure 3. Status of competition in selected services markets – 2008



Source: ITU World Telecommunication Regulatory Database
Note: The column for "basic services" in this chart refers to fixed telephony services.

28. A marked preference of governments to ease themselves out of the business of supplying telecommunications continues. According to ITU figures, by mid-2008, 125 governments had a privately-owned, or partially privatized, fixed-line incumbent operator.[33] Europe and the Americas have the highest percentage of private ownership at 78 and 74 per cent, respectively, followed by Africa and Asia-Pacific (58 per cent). Although a majority of countries in the Arab States still have state owned incumbents (52 per cent), a number of countries in the region have embarked on the privatization path.

B. BARRIERS TO TRADE

29. WTO Members have identified a number of trade restrictions they would like to see removed in the sector in the context of the Doha Development Agenda negotiations (see Section IV, above). In the GATS context, the restrictions Members cite are, for obvious reasons, those within the scope of GATS provisions and the related schedules of commitments. Existing schedules of commitments, however, often list restrictions on the number of suppliers or the level of foreign equity that have since been eliminated or relaxed. In practice therefore, actual restrictions on trade in telecommunications have become much less common, and GATS schedules, particularly ones that did not include a phase-out of restrictions, often no longer reflect actual regimes. Private sector stakeholders tend to remind policy makers that there is still work to be done. Corporate participants in the WTO telecommunications symposium in 2008 mentioned a number of issues and measures.[34] One executive cited discriminatory practices by infrastructure providers, particularly at the wholesale level, and noted that existing non-discrimination requirements needed to be better enforced. Another executive agreed that removal of foreign equity limits was desirable, but also noted that implementation of commitments and regulatory disciplines needed to be thorough and timely, and that

[33] *Ibid*.
[34] See, e.g. Panel E: Corporate Perspective on Developments in Telecommunications Markets, of the WTO Symposium on the 10th Anniversary of the Negotiations on Basic Telecommunications, 20-21 February 2008.

the removal of remaining protection of national incumbents was important, suggesting that those who faced competition improve their performance more rapidly. An intimate link between trade barriers and regulation, it is fair to say, is the primary reason why regulatory frameworks have been an important focus of telecommunications negotiations in the WTO. These negotiating efforts represent an explicit recognition by Members that regulations can have negative implications for market access commitments, if best practice, competition-friendly regulation is not observed in a sector as heavily regulated and transitional as telecommunications.

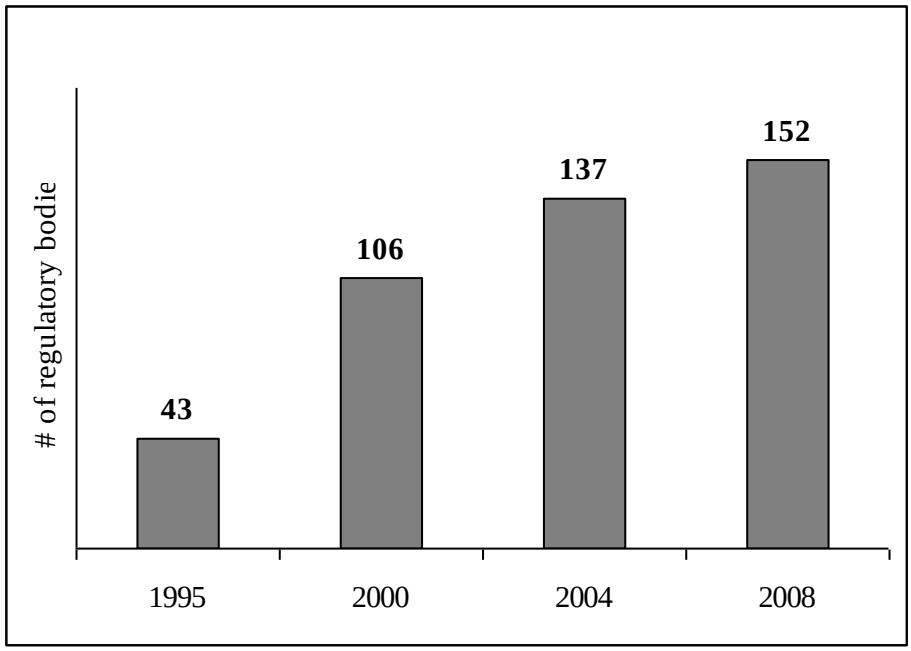
C. REGULATORY ISSUES

30. The Reference Paper on regulatory principles in telecommunications has helped shape the regulatory environment in this sector over the past decade. It has served as a blueprint for sector reform in WTO Members and in countries wishing to accede. Even WTO Member governments who have not yet committed to its provisions have adopted similar principles, either by directly borrowing from it, or by adopting best practice.

1. Independent regulators

31. By 2008, the number of governments with a national entity to regulate telecommunications stood at 152, more than three times the number of governments with such a body in 1995. Since the 1990s regional economic communities have been increasingly involved in the development of model telecom policies and regulations. Through semi-independent regional regulators' associations, these communities aim to harmonize telecommunications policy and regulation across member states in hopes of stimulating cross-border investments and market development.[35]

Figure 4. Number of governments with a telecommunications regulatory body



Source: *ITU World Telecommunication Regulatory Database*

[35] See, for example, van Gorp, Annemijn and Maitland, Carleen, "Comparative research on regional regulators' associations: A theory-driven path for progress", *Telecommunications Po*licy, Vol. 33, No. 1-2, (February-March 2009).

32. The challenges to regulators are manifold as the transition to competition, new technologies and the convergence of different services and industries with traditional telecommunications take hold. Often, regulators find themselves in relatively uncharted territory, particularly for developing economies where regulatory solutions employed in industrialized country governments may be difficult to adapt or less well suited to their circumstances. In some cases, however, new regulators with a relatively blank slate can now pick and choose from a wide variety of best practice options that others have developed, or even avoid adopting outdated regulatory practices from the start. In some cases, developing countries have arrived at new regulatory solutions to support competitive markets better adapted to their national circumstances, a trend that, at its best, could be regarded as "entrepreneurial regulation". In fact, innovative thinking on the part of regulators will be even more important over the next few years as the communications landscape continues to transform itself. However, the demands of more sophisticated legal, economic, accounting and other analytic skills required by regulators of competitive markets and new technologies means that assistance in regulatory capacity building is a priority. Already, it has become an element of multilateral and bilateral technical assistance programs. In addition, many national regulators have increasingly grouped themselves into regional associations to share skills and best practice experiences, as well as to develop examples of model laws and regulations.[36]

2. New and emerging regulatory issues

33. It is beyond the remit of this Note to treat the issues described below at the level of detail or complexity that they may deserve. Bear in mind, however, that considerable thinking, discussion and regulatory efforts on the issues flagged here are underway at the national, regional and multilateral levels. As such, a plethora of information is available to Members who may wish to explore further the potential implications of such issues for trade in telecommunications services and the GATS.

34. *Interconnection.*— Certainly, regulation of traditional interconnection involving links to incumbent fixed networks remains critically important to competitive markets. However, new issues are arising as technologies change and other operators take on larger roles. In some markets, operators of fixed telecommunications are transforming their facilities into IP-based, so-called next-generation networks (NGNs). This prospect is attracting renewed regulatory debate. Some observers argue that interconnection regimes developed neither for the internet nor for traditional telephony networks might be suitable in most NGN contexts. A recent study suggests that in NGNs – as well as in other networks – there is no single interconnection charging model that maximizes economic efficiency in all circumstances.[37] Questions about mobile interconnection rates have also surfaced, with experts questioning why presumably competitive markets have not appeared to be sufficient to bring competitive forces to bear upon the mobile interconnection pricing. The GATS disciplines, particularly Reference Paper commitments, may help address some such issues, in cases where dominance is present or emerges, but in multiplayer markets without clear patterns of dominance regulators are at times unsure of which tools would best ensure fair and market-driven pricing practices.

35. *Mobile Roaming.*— While linked in part to the issue of mobile interconnection, mobile roaming is also an issue in itself, related to the continuing phenomenon of the exceedingly high prices charged by mobile companies to customers who travel abroad with their phones. As with mobile interconnection, regulators have been questioning why a presumably competitive market is able to sustain such high

[36] A variety of such efforts and regional groupings exist. One example, involving ECOWAS, WATRA (the West African Telecommunications Regulator's Association) and a project jointly undertaken by ITU and the European Communities can be found at http://www.itu.int/ITU-D/treg/projects/itu-ec/index.html.

[37] Dodd, Moya; Jung, Astrid; Mitchell, Bridger; Paterson, Paul and Reynolds, Paul, "Bill-and-keep and the economics of interconnection in next-generation networks", *Telecommunications Policy*, Volume 33, Issues 5-6, June-July 2009.

price levels. Most regulatory tools for dealing with market imperfections, if this phenomenon can be considered as such, rely on control or dominance. However, some regulators sense that the problem is more closely associated with lack of transparency and inadequate power of consumers. Given that consumers seldom have little choice other than to pay high roaming charges, regardless of which company they use, observers have also considered the notion that operators may be engaging in tacit or implicit collusion and possible ways of dealing with it.[38]

36. *Spectrum Management.*— Compared with other sector reforms, spectrum policies have been slow to change, perhaps due to the complexity of the area. More recently, however, there are signs of a rethinking of practices so as to better adapt technical, allocation and assignment decisions to competitive environments.[39] Spectrum auctioning is already common in many markets and, in a few cases, experiments in spectrum trading have been initiated or are being contemplated.[40] However, the challenges are considerable. As one observer notes, proposals advanced in this context require the adoption of quite radical changes without a sound empirical basis. In the absence of such evidence it is difficult for policy makers to take more informed positions.[41] Nevertheless, the increasing demand on spectrum resources, as mobile technologies become a predominant form of delivery and satellite services become more affordable, will require innovative and competition-friendly solutions.

37. *Universal Service in a new environment.*— According to one observer, as mobile substitution occurs, the traditional paradigm of fixed line as the universal service obligation is no longer valid and the rules must be changed.[42] Already, some governments are supplementing universal service obligations with additional criteria, such as extending access to the Internet, in general, or broadband services, in particular. Many experts see this as the best incentive for ensuring that competition flourishes in new technology environments. Affordable access for certain under-served or less well off population groups is now seen by governments as not simply a way to close the so-called digital divide, but also to provide support for the livelihoods of such individuals and the sustainability of their communities. Where specific obligations or funding obligations placed on operators appear necessary, governments will need to bear in mind Reference Paper principles such as "transparent, non-discriminatory and competitively neutral". These principles will remain as important for the implementation mechanisms in new environments as they were to universal service schemes linked to fixed telephony.

38. *Promotion of Broadband and NGN.*— In what has become a race to adopt and spread the use of broadband technologies, a number of governments have experienced a frustration with the slow rollout by companies and limited uptake by customers. This may begin to change as more sophisticated mobile devices now hitting the market fall into the hands of more consumers. Broadband technologies can deliver more and better telecommunication services as well as wide variety of other information services. In this respect they are central to many e-government initiatives, but they also expand the potential for many commercial services to be supplied online, and can enhance business communications and logistics. As a result, in addition to erecting a higher goalpost to be met in narrowing the digital divide, broadband is also thought to be critical to the ability of an economy to remain competitive in global markets for international trade in goods and

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[38] See, for example, Rey, Patrick, University of Toulouse "Collective Dominance and the Telecommunications Industry", paper presented at European Commission conference entitled "The Economics of Antitrust in the Telecommunications Sector", 16 September 2002, Brussels.

[39] See, for example, Wellenius, B and I. Neto, "Managing the Radio Spectrum: Framework for Reform in Developing Countries", Policy Research Working Paper No. 4549, World Bank, March 2008.

[40] See, for example, Ibarguen, Giancarlo, "Liberating the Radio Spectrum in Guatemala," *Telecommunications Policy*, Vol. 27, pp 543-664.

[41] Akalu, Rajen, "Opportunity costs and spectrum reform", INFO, Volume 9 Issue 6, 2007.

[42] Chen, Chun-Mei, Tsai, Hsiang-Chih and Mao, Chi-Kuo, "Income, affordable and threshold effects on FMS in the developed and developing economies", *Telecommunications Policy*, Vol. 32, No. 9-10, October-November 2008.

services. Many different approaches are being taken or considered. Some governments, as mentioned above, have folded broadband into universal service policies, while others have developed dedicated funds to spur its growth and development. Yet others have taken a hands off, market driven approach.[43] Some such schemes recently instituted or under consideration hint more at outright subsidy schemes to operators selected to undertake commercial deployment of broadband offerings. If not undertaken with prudence, such policies could risk upsetting the competitive balance between market players. For example, incentive schemes which only take fixed operators into account may ignore the potential for mobile services to become a primary means of broadband access for many groups of consumers. Also, schemes which grant incentives only to the incumbent operator to roll out broadband services may ultimately put other market participants at a competitive disadvantage, and prevent them from contributing to the government's broadband deployment targets. It may be useful to recall that the lingering effects of the "first comer" advantage created by government fiat may be difficult to reverse later on, and that subsidies are not well spent where private investors would otherwise have entered and served targeted markets without such government expenditures.

39. *Local loop unbundling and other regulatory issues raised in PTAs.*— A notable feature of preferential trade agreements (PTAs) negotiated by Members is the telecom regulatory obligations they often contain. The objective of such obligations is similar to that of the GATS Annex on Telecommunications and the Reference Paper, i.e. ensuring effective market access. In some cases the PTAs borrow directly from the disciplines developed in the GATS. In other cases they add value, such as with the inclusion of stronger transparency and licensing provisions, the inclusion of a general interconnect obligation on all telecom suppliers, and the expansion of Reference Paper benefits to value-added services. More recently, however, some PTAs also include issues not explicitly addressed by the Annex and Reference Paper. Examples of this are local loop unbundling, co-location, number portability and dialling parity. In some cases, such as local loop unbundling, the practice had not yet evolved when the Reference Paper was negotiated. Frustrated with continued infrastructure dominance by incumbent operators, and the high costs and disputes that continued to plague interconnection efforts, some governments sought to alleviate the problem by requiring dominant operators to sub-lease portions of their network, thus allowing multiple providers to sell communication services over the same line. Where it has been instituted, according to the OECD, local loop unbundling has changed the competitive landscape of the markets concerned.[44] In other cases, such as co-location, number portability and dialling parity, the issues and potential problems were apparent at the time of GATS negotiations, but were not explicitly included in the disciplines. The Reference Paper competition safeguard provision does not exclude from its coverage any particular aspects of anticompetitive behaviour, and hence might cover anticompetitive practices with respect to these activities. However, it is not uncommon for PTAs to include provisions calling explicitly for control of major suppliers in these areas.[45]

VI. CONCLUSION

40. The right of new entrants to compete in telecommunications markets is only part of the picture. Likewise, the adoption of telecommunications reform laws and regulations, and the scheduling in the WTO of commitments, are only the beginning of a process. In many markets, gaining significant market share continues to be a challenge for new entrants, and their access to the

[43] See, for example, Huigen Jos, and Cave, Martin, "Regulation and the promotion of investment in next generation networks—A European dilemma". *Telecommunications Policy*, Vol. 32, No. 11, December 2008. Among other things, the authors suggest that the incentives to invest are weaker in markets with only one fixed network.

[44] OECD, *Communications Outlook*, 2007.

[45] Tuthill, Lee and Sherman, L., "Telecommunications: Can trade agreements keep up with technology?" in Opening *Markets for Trade in Services: Countries and Sectors in Bilateral and WTO Negotiations*, ed. Marchetti, J.A. and Roy, M., Cambridge University Press. © WTO: 2008.

last mile often remains prohibitively expensive. Suppliers can still sometimes face lack of transparency, unclear or arbitrary licensing criteria and procedures, and legacy measures that, perhaps even unwittingly, give the incumbent an upper hand. Consumers ultimately pay the price when competition is suppressed and the economy-wide benefits of competitive prices and innovative services cannot be realized.

41. WTO Members have long recognized that supportive regulation serves as a complement to the introduction of competition in telecommunications services. Ensuring competition-friendly universal service mechanisms remains important, especially as some governments contemplate expanding the scope of such obligations to include Internet and broadband services. At a time when many governments around the world are contemplating ways to hasten the expansion of broadband services, it may also be useful to bear in mind the advantages of cost-reducing, market-based infrastructure incentives. Market imperfections or anticompetitive practices, if they emerge in the mobile or broadband industries, may need to be addressed. Competition-inducing spectrum management policies are also worth exploring, as greater demands are placed on spectrum usage. Protection of legacy, fixed operator prerogatives, such as bans on Voice over Internet Protocol (VoIP), maintenance of traditional accounting rates, and lack of adequate competition in capacity leasing can impede efforts to secure modern communications services, and inhibit the emergence of IT-enabled services.

42. It is not surprising that interest among both developed and developing countries for new and better commitments on telecommunications is a notable feature of the Doha Development Agenda negotiations. More offers have thus far been tabled in telecommunications than in any other sector, aside from financial services. The opening of telecom markets to international trade has been pivotal to growth and development in most Members' economies. The WTO-led trade initiatives in telecommunications have coincided to a remarkable extent with major shifts in national policy and have often helped governments avoid pressures to backtrack on reforms. The consensus achieved in the WTO on the broad parameters of regulatory best practice, by means of the GATS Annex on Telecommunications and the Reference Paper, has provided a blueprint for success and helped to fortify regulatory bodies. However, enhanced implementation efforts are equally important. They are key, not only to trading partners whose suppliers wish to contribute to telecom growth through market access, but also to the ability of the reforming governments to meet national telecommunications and economic development targets. Overall, the degree of enthusiasm, good faith and best efforts Members have demonstrated to live up to GATS commitments and regulatory disciplines in the telecommunications sector has been impressive. However, fine-tuning implementation efforts may pose challenges and require significant further attention in the coming years.

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APPENDIX

SECTION 1: Definitional sources for telecommunications services

Figure A1. Telecommunications services in the GATS Services Sectoral Classification List (MTN/GNS/W/120)

2.	COMMUNICATION SERVICES	
C.	Telecommunication services	
a.	Voice telephone services	7521
b.	Packet-switched data transmission services	7523**
c.	Circuit-switched data transmission services	7523**
d.	Telex services	7523**
e.	Telegraph services	7522
f.	Facsimile services	7521**+7529**
g.	Private leased circuit services	7522**+7523**
h.	Electronic mail	7523**
i.	Voice mail	7523**
j.	On-line information and data base retrieval	7523**
k.	electronic data interchange (EDI)	7523**
l.	enhanced/value-added facsimile services, incl. store and forward, store and retrieve	7523**
m.	code and protocol conversion	n.a.
n.	on-line information and/or data processing (incl.transaction processing)	843**
o.	other	

Figure A2. Note by the Chairman, Notes for Scheduling Basic Telecoms Services Commitments, Group on Basic Telecommunications (S/GBT/W/2/Rev.1, 16 January 1997)

1. Unless otherwise noted in the sector column, any basic telecom service listed in the sector column:
   (a) encompasses local, long distance and international services for public and non-public use;
   (b) may be provided on a facilities-basis or by resale; and
   (c) may be provided through any means of technology (e.g., cable[1], wireless, satellites).

2. Subsector (g) --private leased circuit services -- involves the ability of service suppliers to sell or lease any type of network capacity for the supply of services listed in any other basic telecom service subsector unless otherwise noted in the sector column. This would include capacity via cable, satellite and wireless network.

3. In view of points 1 and 2 above, it should not be necessary to list cellular or mobile services as a separate subsector. However, a number of Members have done so, and a number of offers have commitments only in these subsectors. Therefore, in order to avoid extensive changes in schedules, it would seem appropriate for Members to maintain separate entries for these subsectors.

Figure A3. Related Definitions from the Annex on Telecommunications

(a) "Telecommunications" means the transmission and reception of signals by any electromagnetic means.

(b) "Public telecommunications transport service" means any telecommunications transport service required, explicitly or in effect, by a Member to be offered to the public generally. Such services may include, *inter alia*, telegraph, telephone, telex, and data transmission typically involving the real-time transmission of customer-supplied information between two or more points without any end-to-end change in the form or content of the customer's information.

(c) "Public telecommunications transport network" means the public telecommunications infrastructure which permits telecommunications between and among defined network termination points.

Figure A4. Main text of Note by the Chairman on Scheduling Basic Telecom Services Commitments (S/GBT/W/2/Rev.1)

1. Unless otherwise noted in the sector column, any basic telecom service listed in the sector column:

(a) encompasses local, long distance and international services for public and non-public use;

(b) may be provided on a facilities-basis or by resale; and

(c) may be provided through any means of technology (e.g., cable[1], wireless, satellites).

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[1] Including all types of cable.

SECTION 2

Table A1. Summary of Specific Commitments on Telecommunications Services, by Member, 2009

	a.	b.	c.	.d.	e.	f.	g.	h.	i.	j.	k.	l.	.m.	n.	o.1.	o.2.
Albania	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Antigua and Barbuda	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Argentina	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Armenia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Australia	X	X	X	X		X	X	X	X	X	X	X	X		X	X
Austria	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Bangladesh	X	X	X	X	X	X	X								X	X
Barbados	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Belize	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bolivia	X	X	X	X	X	X	X								X	X
Brunei Darussalam	X		X			X		X		X	X	X			X	
Bulgaria	X	X	X	X	X	X	X			X		X	X		X	X
Cambodia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Canada	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chile	X	X	X	X	X	X	X	X		X				X	X	X
Cape Verde	X	X	X			X	X	X	X	X	X		X		X	X
China	X	X	X			X	X	X	X	X	X	X	X	X	X	X
Colombia	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
Congo RP	X															
Côte d'Ivoire	X	X	X	X	X	X	X								X	X
Croatia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cuba	X	X	X	X	X	X										
Czech Republic	X	X	X	X	X	X	X								X	X
Djibouti	X	X	X	X	X			X					X		X	X
Dominica	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Dominican Republic	X	X	X	X	X	X	X								X	X
Ecuador	X							X	X	X	X	X	X	X	X	
Egypt	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
El Salvador	X	X	X	X		X	X								X	X
Estonia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
European Community (12)	X	X	X	X	X	X	X	X	X	X	X		X		X	X
Finland	X	X	X	X	X	X	X	X	X	X	X		X		X	X
FYR Macedonia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gambia	X	X	X	X		X	X	X	X	X	X	X				
Georgia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ghana	X	X	X	X	X	X	X								X	X
Grenada	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Guatemala	X	X	X	X	X	X	X								X	X
Guyana										X						
Hong Kong	X	X	X			X	X	X	X	X	X	X	X	X	X	X

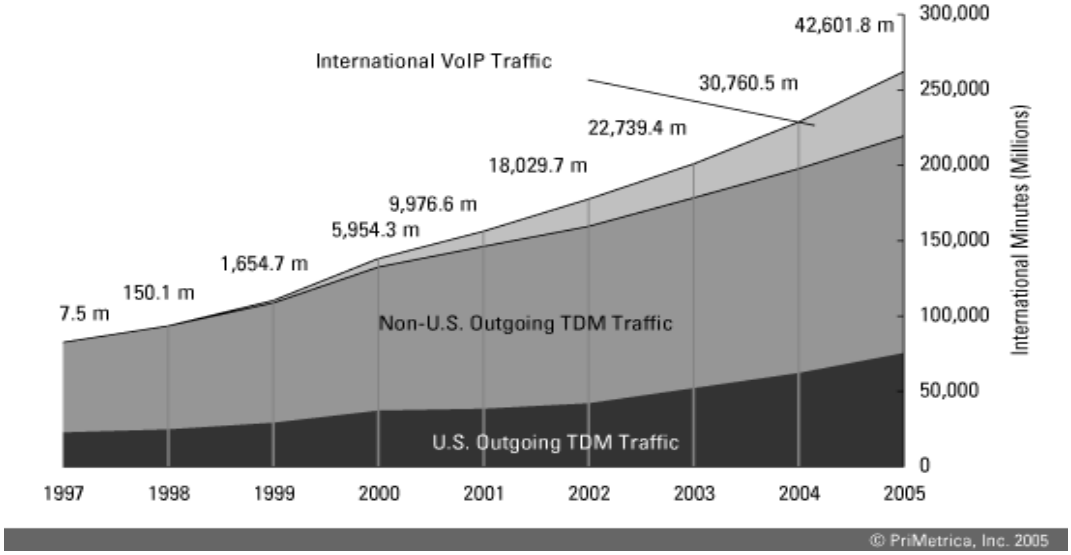
	a.	b.	c.	.d.	e.	f.	g.	h.	i.	j.	k.	l.	.m.	n.	o.1.	o.2.
Hungary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Iceland	X	X	X	X	X	X	X	X	X	X	X		X		X	X
India	X		X			X	X	X	X	X		X		X	X	
Indonesia	X	X	X	X	X			X	X					X	X	X
Israel	X	X	X	X		X	X	X	X	X	X	X			X	X
Jamaica	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Japan	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Jordan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kenya	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Korea RP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kyrgyz Republic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Latvia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lesotho								X		X	X	X	X	X		
Liechtenstein								X	X	X	X	X	X	X	X	
Lithuania	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Malaysia	X	X	X	X	X	X	X	X	X	X		X	X		X	X
Mauritius	X	X	X	X	X	X	X								X	X
Mexico	X	X	X			X	X	X	X	X	X	X	X	X	X	X
Moldova	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mongolia								X	X	X	X	X	X	X		
Morocco	X	X		X			X	X	X	X	X	X			X	X
Nepal	X	X	X	X	X			X	X			X			X	X
New Zealand	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Nicaragua			X	X	X	X	X	X	X	X	X	X	X	X	X	
Nigeria	X							X	X	X	X	X	X	X	X	
Norway	X	X	X	X	X	X	X	X	X	X	X	X			X	X
Oman	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pakistan	X	X	X	X	X	X	X			X				X	X	X
Panama								X	X	X	X	X	X	X		
Papua New Guinea	X	X	X	X	X	X	X								X	X
Peru	X	X	X	X	X	X	X	X	X	X		X		X	X	X
Philippines	X	X	X	X	X	X			X	X	X				X	
Poland	X	X	X	X	X	X	X	X	X	X	X	X			X	X
Romania	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Saint Kitts & Nevis								X	X					X		
Saudi Arabia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Senegal	X	X	X	X		X	X	X					X		X	X
Singapore	X	X	X				X	X	X	X	X			X	X	X
Slovak Republic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Slovenia								X	X	X		X	X			
South Africa	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Sri Lanka	X	X	X			X									X	X
Suriname	X	X	X	X		X	X								X	X
Sweden	X	X	X	X	X	X	X	X	X	X	X		X		X	X
Switzerland	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chinese Taipei	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Thailand	X			X	X	X	X			X				X		

	a.	b.	c.	.d.	e.	f.	g.	h.	i.	j.	k.	l.	.m.	n.	o.1.	o.2.
Tonga	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trinidad and Tobago	X	X	X	X	X		X			X	X	X	X	X	X	X
Tunisia	X	X		X											X	X
Turkey	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Uganda	X						X								X	X
Ukraine	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
USA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Venezuela	X	X	X				X								X	X
Viet Nam	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zimbabwe		X	X			X		X	X	X	X	X	X	X		
Total Schedules	**88**	**82**	**83**	**76**	**64**	**77**	**78**	**74**	**70**	**75**	**66**	**64**	**63**	**60**	**86**	**79**

Source: WTO
Note: The European Communities commitments, reflected as one schedule in this table, are those of the EC-12.

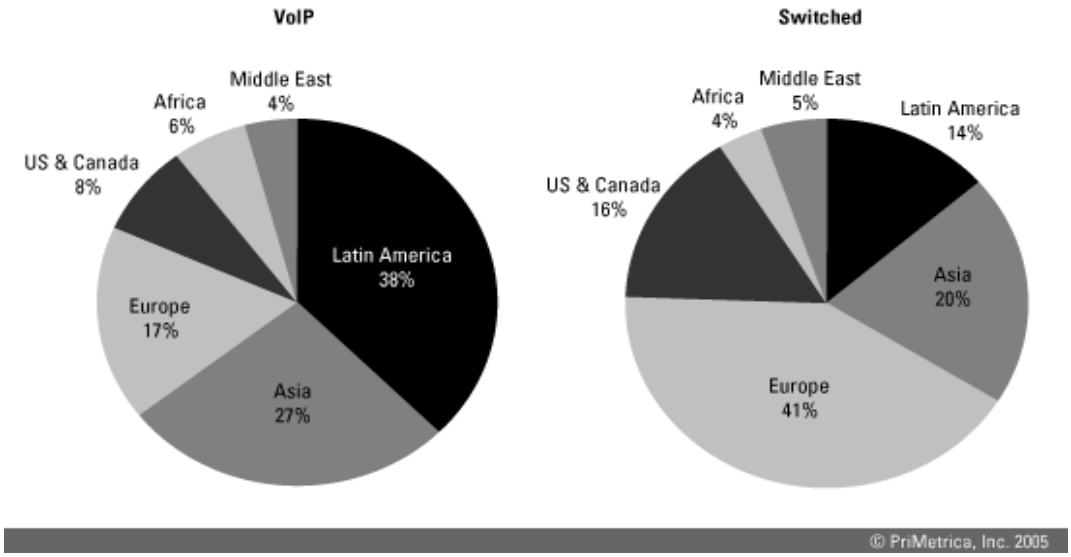
Key:
a. Voice Telephone Services
b. Packet-Switched Data Transmission Services
c. Circuit-Switched Data Transmission Services
d. Telex Services
e. Telegraph Services
f. Facsimile Services
g. Private Leased Circuit Services
h. Electronic Mail
i. Voice Mail
j. On-line Information and Data Base Retrieval
k. Electronic Data Interchange (EDI)
l. Enhanced/Value-Added Facsimile Services
m. Code and Protocol Conversion
n. On-line Information and/or data processing
o.1. Other – Mobile Cellular
o.2. Other – Mobile Satellite

Figure A5. International VoIP & Switched Traffic Growth, 1997-2005



Voice-over-IP (VoIP) traffic includes all cross-border voice calls carried on IP networks but terminated on public switched telephone networks. PC-to-PC calls and private network traffic are excluded. Switched traffic includes circuit-switched voice and fax traffic carried on traditional international facilities as well as international simple resale (ISR) facilities. Figures for 2005 are projections.

Figure A6. International VoIP & Switched Traffic Termination Summary, 2004



Charts represent the percentage of total inbound VoIP and inbound switched traffic by region. Voice-over-IP (VoIP) traffic includes all cross-border voice calls carried on IP networks but terminated on public switched telephone networks; PC-to-PC communications and private network traffic are excluded. Switched traffic includes circuit-switched voice and fax traffic carried on traditional international facilities as well as international simple resale (ISR) facilities. Asia includes traffic to Australia and New Zealand, and Latin America includes traffic to the Caribbean.

Source: TeleGeography research, data excerpted from TeleGeography 2006 © PriMetrica, Inc. 2005.