Philippine Review of Economics
Volume XXXVII. No.1,June 2000

TECHNOLOGICAL CONVERGENCE AND COMPETITION: THE TELECOMMUNICATIONS INDUSTRY

Ma. Joy V. Abrenica

Introduction

In recent years, technology has radically changed the regulatory axis in the telecommunications sector. Until the end of the 1970s, the sector was perceived to be a natural monopoly. Thus there were strategic reasons for nurturing monopolies. Foremost, a monopolist would have sufficient network to generate economies of scale. Secondly, a monopolistic structure avoids market segmentation and permits the building of a network that is integrated and national in scope. Thirdly, it is convenient to impose on the monopolist the obligation of universal service, i.e., the provision of service to marginal social groups, because cross-subsidization of services is feasible in the absence of competition. During the 1980s, technological advances in transmission and switching have substantially reduced the cost of service provision, created capacity glut, and expanded market demand. These changes rendered obsolete the natural monopoly paradigm, and precipitated the wave of privatization, liberalization, and deregulation that transformed the telecommunications sectors in many countries from monopolistic to competitive markets.

Yet even before the metastasis can be completed, a second wave of regulatory reforms is in the offing. Previously distinct industries are converging, namely, telecommunications, broadcasting, and computing. These industries represent three different information formats – voice, video and data, respectively, that are delivered on different physical and economic infrastructures. Digitalization,[1] the technological basis of

[1] The process of digitalization was first applied in the computer industry, subsequently spreading to telecommunications, and lately to broadcasting (ITU, 1995, p. 19).

convergence, eliminates the differences by transforming voice, data and video into a common stream of binary bits or bytes, which can be transmitted through the same medium. The upshot is the blurring of industry boundaries. It becomes difficult to discern where one industry begins and ends, since telecommunications, broadcasting and computing are now regarded as a family of information technologies dubbed as multimedia services. Such fusion has given rise to the vision of an 'information superhighway' — an ambitious architecture that can supply a full range of interactive multimedia services to business and individual users.[2] But it also presents new and complex regulatory challenges.

Consider the debate on whether voice transmitted over the internet can be classified as voice telephony. Hitherto, the regulation that applies to voice telephony is distinct from that of data transmission. Many companies have taken advantage of the regulatory arbitrage by establishing international long-distance telephone-to-telephone services via the internet. Indeed, internet telephony is driven by regulatory distortion of keeping long-distance telephone tariffs above marginal cost to maintain the cross-subsidy for local services. Yet internet telephony is also a good example of a service classification that is confounded by technological convergence. When a consumer initiates the service using the traditional telephone system to connect to an internet gateway, the voice is encoded for Internet Protocol (IP) packet transmission. At this point, the transmission can no longer be identified as voice; it becomes a part of a common global data stream. Near its destination, the transmission is decoded into voice format and passed onto a local connection. It is then received by the called party via the telephone. Since the differentiation of the message as voice, data, or video is only pertinent to the sender and receiver, as these are all transmitted as bits, regulating on the basis of information content becomes impractical.

Clearly, technological convergence necessitates regulatory reforms. At the very least, streamlining of independently-designed regulations that now apply to telephony, broadcasting,

---

[2] Many countries, the Philippines included, have fallen infatuated with the concept, thus the proliferation of national and international plans to build a collosal information infrastructure.

cable and computer is required. The rebus however is the form of regulation apropos to the multimedia network. Each sector has maintained distinct technologies, architectures and pricing mechanisms. The clash between voice telephony and internet is a clear illustration.[3] Inevitably, regulation will have to consider the technology and economics of the network in question.

It should also be noted that the regulatory traditions are diverse. The telecommunications sector has been carrier-regulated, i.e., controls are placed on market entry, pricing and technical standards to ensure interconnection and interoperability of the system. Broadcasting regulation is focused on content, i.e., what can be broadcasted; whereas the computer industry operates under a free-market environment. The intersection of these different regulatory traditions is null; thus the new regulatory regime may have features alien to some or all sectors. It is recognized however that while convergence may lead to less regulation in telecommunications and broadcasting, it should not lead to more regulation in computing.

Other policy concerns are brought forward. To what extent will the new regulatory framework impact on the policy objectives that have been built into the existing industry-specific regulatory frameworks? Concretely, if the laissez-faire tradition that governs the computing industry were applied to telecommunications and broadcasting, how will this fare with the social goal of ensuring affordable and universal access that is underscored in the present telecommunications regulation? Will a fully competitive model of provision of infrastructure, products, and services support the vision of an interconnected and interoperable network of networks? How will issues related to copyright, privacy, content, and security be resolved under the new regulatory environment?

To be sure, the telecommunications sector is in a strong position to influence the evolution of regulation by virtue of its control of the largest interconnected global public communications network.[4] The structure of the telecommunications sector is

---

[3] See Manishin (1996) for an illuminating exposition on the differences between telephony and the internet.

[4] Moreover, to date, the demand for interactivity is best satisfied by the telephone. Broadcasting is traditionally non-interactive; while computer-based networks such as the Internet can be interactive, but the flow of communications is not real-time.

likely to influence the pace and direction of informatization of the economy to the extent that the level of informatization that will be attained owes much to the response of the sector to the challenges presented by technological convergence.

This paper describes the dynamics of technological convergence and analyzes its possible impact on the Philippine telecommunications sector. The next section discusses the phenomenon of convergence from a technological standpoint and from a regulatory perspective. This is followed by a review of the state of Philippine telecommunications sector in Section 2, where the structural and regulatory barriers to convergence are underscored. Current initiatives to remove these barriers are evaluated in Section 3. These initiatives include a Convergence Bill pending before the legislative body and the Philippine commitment to WTO to further liberalize the telecommunications sector. The final section outlines the regulatory paradigm that is deemed essential in developing a multimedia infrastructure and in catching-up with the huge information gap that divides rich and poor countries.

1. Managing the Transition

Technological convergence has thus far proceeded in two stages. The first stage is the integration of computing and telecommunications that dates back to the late 1950s and early 1960s. Digital standards of computing were introduced into the design of the telecommunications equipment (transmission and switching) and the software used to operate the network. These transformed the telecommunication system into something like a giant computer with multi-functional capabilities of computing.[5]

In fixed-link telecommunications, carriers began installing digital exchanges in the 1980s to replace electromechanical (analogue) exchanges. The integrated services digital network (ISDN) combines into a single network previously separate networks for voice and data services. It simplified network management and enhanced the delivery of both voice and data communications. The digitization of backbone networks is

[5] Melody, 1996.

expected to be completed by 2005.[6]

Digital standards such as GSM, DAMPS, and CDMA superseded the analogue standards of NMT, TACS and C-450 in mobile telecommunications in 1992. Interestingly, the diffusion of digital cellular telephones was faster in countries with smaller analogue user base. The relatively slow adoption of digital standards in countries which have extensive analogue user base, such as North America and some parts of Europe, demonstrates the risks of technological lock-in that attends the selection of standards.[7]

What hastened the transition of telecommunications to the digital era are the dramatic decline in the cost of fiber optic used in local loops, and the rapid growth in transmission capacity coupled with falling prices of telephone exchange switches. Consequently, the modernization of telecommunications network created new services that add value to the basic telephone call. These added services (e.g. information services, reservation systems, bulletin boards), called "value-added network services" (VANS), open the telecommunications market to the entry of new firms who grabbed these market opportunities by leasing lines from incumbent carriers.

The second stage of technological convergence involves the digitalization of the content being transmitted over the network, i.e., films, television programmes, databases, etc. The digitalization of these materials permit their transmission over a digital telecommunication network. The process has however been slowed down by costs, copyright issues and absence of standards for digital delivery system.[8] Notwithstanding, the trend in network development leans towards increasing interactivity, with features that include users' control and inquiry.

A hybrid network architecture is likewise fast emerging. This is the kind of network that allows telephone calls to be made over cable TV networks or internet, and video entertainment to be delivered using telephone networks. Although the final structure of the future information infrastructure cannot be predicted with reasonable confidence, the present trajectories

---

[6] ITU, 1995, p. 71.
[7] Ibid.
[8] ITU, 1995, P. 78.

of the different technologies suggest that public telephone network is likely to be the dominant route for information travels.[9] Key to the realization of this vision is the future progress to be made in optical fiber and digital compression techniques.[10]

Regulatory Challenges

How will these technological changes influence regulation? The regulator confronts a sundry of governance issues but two are most relevant to a less developed country. First is the choice of network infrastructure, and second is the need to build a ubiquitous infrastructure that links everyone including those in marginal and remote areas.

The matter of network choice is the crux of technology management. Selecting and designing a network becomes intricate in view of possible technological lock-in and rapidly evolving technologies. In one sense, countries with underdeveloped network have the advantage of installing the most advanced communication facilities without being constrained by the costs stranded in the older network. Where private sector involvement in network development is being encouraged, the policy norm must be one of technological neutrality even as efforts are exerted to minimize duplication of investments. Yet another option is network integration. China, for example, plans to develop an integrated cable TV and telephone network that would redound to a savings of about US$30 billion in communications infrastructure development.[11] Despite this, the resources required for investment are still enormous. Consequently, a good regulatory blueprint must be able to identify reliable and sustainable sources of funds for network building.

In 1995, the G7 Ministerial Conference on the Information Society recommends building the information infrastructure through *private investment, competition* and *flexible*

[9] There are six candidate networks for future information infrastructure, namely, public telephone network, cellular and other mobile communications network, terrestrial broadcast television, cable TV network, direct-to-home (DTH) satellite services, and the Internet (ITU, 1995, p. 21).

[10] A Delphi study in Germany forecasts that by 2010, optical data storage will have a capacity as much as one (1) gigabyte per square centimeter.

[11] ITU, 1995, p. 58.

regulation, with due provision for *nondiscriminatory access* and *universal service*.[12] The first three principles constitute a market-oriented approach to network building, but they do not necessarily fit well with the social-oriented goals of nondiscriminatory access and universal service. For one, competition undermines the traditional source of funding for universal service, which is cross-subsidy. Moreover, in economies with limited market size and where resources are concentrated to a few, wide open competition may not prevent takeovers and mergers that can eventually deprive consumers of choice of network operator or service provider. The regulatory challenge therefore is striking a balance between market and social objectives.

Prior to convergence, the regulatory model is one of monopolistic provision of basic infrastructure and services. In many cases, open competition is allowed in mobile communications and value-added service markets. This model avoids market fragmentation and duplication of investments. Tight regulation is supposed to eschew overconcentration of investments in thick routes and undersupply in thin routes. Yet often, the monopolist can still flex its muscles by limiting network access especially when it has stakes in the competitive market segments. Moreover, in societies with weak antitrust tradition, reining the market power of the monopolist proved to be difficult.

A variant model maintains monopoly control over infrastructure, but opens to competition the delivery of basic and advanced services. This of course presupposes an enforceable separation of infrastructure and service provision. Such separation may take several forms: (1) structural, as when the owner of the network and the service providers are separate legal entities; (2) unstructural, i.e., the monopoly offers competitive services through a subsidiary, and the regulator imposes separate accounting of costs and revenues; and (3) network unbundling, i.e., separate accounting of discrete physical components of the telecommunication system such as switches, transmission, and exchanges.[13] In any case, the motivation

[12] ITU, 1995, p. 35.

[13] Solomon and Dawker, 1995.

for separating infrastructure control from service provision is to ensure fair competition and to maximize the utilization of the broadband network, which may be owned by the state or a private sector monopoly. The historical performance of monopolists (be it state or private sector) with respect to universal service is uneven. Moreover, the regulator has to guard against the tendency of the monopolist to price discriminate amongst service providers, i.e., to set prices based on demand rather than cost.

Convergence undermined the monopoly model as it created opportunities for new networks to compete with traditional networks — telephony service and cable transmission. Wireless technologies such as cellular transmission (Personal Communication Systems), wireless cable (Multichannel Multipoint Distribution System or MMDS), satellite transmissions (Direct Broadcasting System or DBS), and recently CellularVision[14] are alternative technologies that permit new entrants to circumvent the traditional copper wired telephony or coaxial cable infrastructure of incumbent operators. Yet new technologies such as Integrated Service Digital Network (ISDN) and Asynchronous Digital Subscriber Line (ADSL) have also permitted traditional operators to upgrade the transmission capacities of their existing infrastructures and compete with advanced service providers. Absent market impediments, a vigorous competition in infrastructure development and service provision between entrants and incumbents can be expected.

If the full benefits of technological change are to be reaped, the regulator has to allow full competition in both infrastructure and service provisions. Yet this makes the market vulnerable to uneven and fragmented distribution of services, as well as duplication of investments. Moreover, service providers and network owners tend to concentrate in high growth areas where costs are faster to recoup in view of the rapid turnover of innovation that is now outpacing the rate of market absorption. Thus, even as competition has proven to

[14] CellularVision telecommunication system is a "local multipoint distribution system" (LMDS) that offers multichannel interactive television, telephony, videc teleconferencing, computer interface, and data transfer. (See www.cellularvision.com.)

be a powerful force behind network expansion and modernization, universal service is not guaranteed.

2. The State of Philippine Telecommunications Sector

In the last five years, the Philippine telecommunications sector was shaken by a series of market-oriented reforms that led to unprecedented expansion in network, and shift in market structure from monopoly to competition.[15] Is the sector ready to embrace technological convergence?

Until the reform, the local telephone service was virtually a monopoly of the Philippine Long Distance Telephone Co. (PLDT) that owned about 93.8 percent of the main stations. PLDT also controlled the national long-distance service by virtue of its ownership of the only nationwide backbone transmission network. In addition, PLDT dominated the international long distance service although it faced minimal competition from two international record carriers — Eastern Telecommunications Philippines, Inc. (ETPI) and Philippine Global Communications, Inc. (PhilCom). The market for cellular mobile telephone service was a duopoly, contested by PLDT's subsidiary Pilipino Telephone Corp. (Piltel) and Express Telcommunications Co., Inc. (Extelcom).

In 1982, the government was poised to temper PLDT's control by building an alternate backbone transmission through the Regional Telecommunications Development Project (RTDP) and the National Telephone Program (NTP). The NTP, in particular, aimed to install two million telephone lines within a five-year period. But the economic and political crisis that followed foiled the plan.

The rate of telephone penetration mirrored the absence of growth in the sector during this period. In 1977, the telephone density index was 0.8 percent; it remained less than 1 percent until 1990. An extended list of telephone applicants kept many consumers waiting to be connected for years, since a mere 6 percent of applications could be served within four months. PLDT was saddled with 800,000 telephone backlog; three-quarters of applications were from Metro Manila. The

[15] This section draws heavily from Abrenica (forthcoming).

problem however was not mere supply shortage. The quality of service was also poor. Trouble complaints per 100 telephones per month was 17 in 1988, whereas comparable statistics in Thailand was 4.5 to 7 and in Indonesia, 8 to 9. The benchmark was 4 to 5 percent.[16] There were also problems regarding unbalanced distribution of service between rural and urban areas, outdated infrastructures, and inadequate interconnection of telecommunications facilities.

There were efforts to revitalize the lethargic sector during the Aquino incumbency. A Department Circular issued in 1987 outlined the administration's policy framework on telecommunications development. The target was to create an integrated national telecommunications network under a competitive but regulated market environment.[17] In 1989, an ad hoc committee composed of government and industry representatives drafted a 20-year National Telecommunications Development Plan (NTDP) to cover the period 1991-2010.

NTDP's targets were relatively modest: (1) raising telephone density from less than 1 percent to 3.8 percent by 1998, and 10 percent by 2010; (2) providing local telephone exchange service to all municipalities by 2010; (3) upgrading the quality of telephone service; (4) extending public calling office service to all unserved municipalities and to about 50 percent of all barangays nationwide by 2010; (5) broadening the access to public data network services; (6) nationwide coverage of cellular mobile telephone service; and (7) deploying integrated services digital network (ISDN) trial exchanges in Metro Manila by 1994 and in Cebu by 1995. The regulatory strategy to meet these service expansion targets was to enlist private sector investment, while limiting the role of the government to policymaking and regulation. All government telecommunications operations were to be turned over to the private sector to increase service efficiency and stimulate investments. It was envisioned however that the government would continue to facilitate official development assistance (ODA)-funded telecommunications project, such as the installation of public telephones in underserved and economically

---

[16] DOTC, 1993, p. A-13.
[17] DOTC Circular No. 87-188.

unviable areas under the Municipal Telephone Act of 1989.[18]

In local exchange service, the policy was to rationalize its provision, which meant authorizing only one franchised local exchange carrier for each defined local exchange service area.[19] The basis for such policy was the view that local exchange service is a natural monopoly, hence the imperative to maximize economies of scale and minimize network fragmentation. Franchising and certification policies favored larger economic units and encouraged mergers of small carriers in the interest of economies of scale. For long-distance telephone service (national and international), the policy was to introduce some degree of competition, but entry was to be regulated, and price competition limited, to maintain the intra-sectoral subsidy that flows from long distance to local exchange service.[20]

When the Ramos government assumed office in 1992, it found the country's telephone penetration record dismal at 1.17 percent, while neighboring Thailand's tdi was 2.4 percent; Malaysia, 10 percent; and Korea, 33 percent. Few private investments were solicited despite a huge unmet demand. Moreover, the planned introduction of limited competition in the long-distance service market did not materialize as the incumbent carrier, PLDT, challenged in courts the granting of authority to rival Eastern Telecommunications Philippines, Inc. (ETPI) to operate its own international gateway. Neither did the privatization of government telecommunications facilities proceeded as scheduled, since this was again tarried by the legal battle between PLDT and winning bidder Digital

[18] Republic Act No. 6849.

[19] DOTC Circular No. 91-260.

[20] It is useful to note that for information services, NTDP considered a more radical restructuring of the sector, but there was no policy initiated to realize this plan. Implicitly addressing the problem of interconnection, NTDP suggested the following: ...For businesses in the Philippines to be internationally competitive, such (information) services must be fostered and the most effective means is via a competitive, essentially unregulated market. While such services should be subject to minimal regulation, it will be necessary to ensure that the firms offering telephone and information services do not engage in unfair pricing practices, and that competitive services, as group, are offered on a compensatory basis. Structural separation, under which firms providing both monopoly and competitive services are allowed to offer the competitive services only through an arms-length subsidiary, may be one way to ensure fair competition... An alternative structural separation model would allow entities to enter only one of their service categories (local exchange, inter-exchange, value-added services, international gateway, etc.). This would ensure that costs were effectively separated and the opportunities for exploiting monopoly powers minimized. (DOTC, 1993, p. 27)

Table 1
Service Area Scheme

Service Area		Coverage	Assigned Carrier
1	Region I	Abra, Ilocos Norte, Ilocos Sur, La Union, Pangasinan, Mt. Province, Benguet	Smart Digitel
	NCR - D	Pasay City, Las Pinas, Paranaque, Pateros, Taguig, Muntinlupa	Smart
2	Region II	Batanes, Cagayan Valley, Isabela, Quirino, Nueva Viscaya, Ifugao, Kalinga-Apayao	ETPI Digitel
	NCR - A	Manila, Navotas, Caloocan City	ETPI
3	Region III	Tarlac, Pampanga, Zambales, Bataan, Bulacan, Nueva Ecija	Smart Digitel
4	Region IVA	Aurora, Laguna, Quezon, Marinduque, Rizal, Romblon	PT&T/Capwire Digitel
5	Region IVB	Cavite, Batangas, Mindoro Occidental, Mindoro Oriental, Palawan	Globe Digitel
6	Region V	Albay, Camarines Norte, Camarines Sur, Catanduanes, Masbate, Sorsogon	Bayantel/ICC Digitel
7	Region VI	Aklan, Antique, Capiz, Iloilo, Negros Occidental, Guimaras	Islacom
	Region VIIA	Negros Oriental, Siquijor	Islacom
8	Region VIIB	Bohol, Cebu	Islacom
	Region VIII	Eastern Samar, Leyte, Northern Samar, Southern Leyte, Samar, Biliran	Islacom
9	Region IXA	Zamboanga del Norte, Zamboanga del Sur	Piltel Major/Philcom
	Region X	Agusan del Norte, Agusan del Sur, Bukidnon, Camiguin, Misamis Occidental, Misamis Oriental, Surigao del Norte	Piltel Major/Philcom
	Region XIB	Surigao del Sur, Davao Oriental	Piltel Philcom
10	Region XIA	Davao del Norte, Davao del Sur, South Cotobato, Sarangani	Piltel Major/Philcom

	Region IXB	Basilan, Sulu, Tawi-Tawi	Piltel Major/Philcom
11	Region XII	Lanao del Norte, Lanao del Sur, Maguindanao, North Cotabato, Sultan Kuldarat	Globe
	NCR - C	Makati, San Juan, Mandaluyong, Marikina, Pasig	Globe

Source: National Telecommunications Commission.

Telecommunications Philippines Inc. (Digitel). PLDT was also accused of discriminating in favor of its subsidiary Piltel in the provision of trunks for interconnection of cellular phones.

The first act to restructure the sector was the opening of the cellular mobile telephone service market[21] in November 1992; three new operators responded. In February 1993, Executive Order No. 59, also known as the "Telecommunications Interconnection Policy" was enacted, mandating all authorized carriers to interconnect in an effort to create a universally accessible and integrated nationwide telecommunications network. A few months later followed the issuance of Executive Order No. 109, the "Universal Telephone Service Policy," that required international gateway and cellular telephone operators to provide local exchange service in unserved and underserved areas.

The implementing rules and regulations of EO 109 laid down the provisions of the so-called Service Area Scheme (SAS), which divided the country into 11 service or franchise areas assigned to nine telecommunication carriers who are either cellular operator or international carrier, or both. The motivation for the scheme was to hasten the provision of telecommunications services in areas which were formerly franchised solely to PLDT. Cellular operators were obliged to install at least 400,000 telephone lines in three years, while international carriers were given five years to put up 300,000 domestic lines (Table 1).

In March 1995, Republic Act 7925, also known as the Public Telecommunication Act, put the legislative seal to the telecommunications reforms. Among the salient provisions of

[21] DOTC Circular 92-269.

the Act are: (1) reducing the time given to international carriers to provide local exchange service from 5 to 3 years; (2) removing the 12 percent ceiling on the rate of return; (3) institutionalizing revenue sharing negotiations between carriers as the manner of settling interconnection agreements; (4) broadening ownership of telecommunications systems by requiring carriers to make a public offering of their stocks; and (5) prohibiting a single franchise to engage in both telecommunications and broadcasting either through the airwaves or by cable.

The entry of nine companies into the local exchange market generated a commitment to install 5.36 million lines, which translates to a giant stride in teledensity from 1.21 percent in 1993 to 9.78 percent by the end of the program, i.e., in 1998. Faced with the threat of competition, PLDT launched its Zero Backlog Program aimed at sharply reducing the pending applications by installing 1.25 million lines between 1993 and 1996.

Partial deregulation of the telecommunications sector registered successes but also threw up a sundry of anomalies. Most apparent of these successes is the growth of the network, surpassing the targets envisioned under the NTDP. By the end of 1997, the teledensity was registered at 8.07, which is slightly short of the 8.31 tdi SAS target, but more than twice the 3.5 tdi NTDP target. Moreover, there is a good chance that the 1998 target of almost 10 phones per 100 inhabitants (9.78 tdi) will be met if the first semester report proved accurate (9.55 tdi).

Despite the improvement in telephone density, five out of nine carriers with lines commitment under EO 109, missed out on their roll-out targets.[22] The difficulty lies in sourcing funds for capital investments. Significantly, all carriers enjoy foreign equity,[23] but few of them have tapped the stockmarket despite a law requiring them to offer 30 percent of their authorized capital stock to the public within the first 5 years of

---

[22] These are Islacom, Philcom, Piltel, PT&T, and ETPI.

[23] This includes PLDT and Piltel, the controlling stocks of which are now controlled by HK-based First Pacific.

[24] The target represents 87 percent of the total 1,611 cities and municipalities

Table 2
Basic Telecommunications Indicators

	1990	1996
Telephone Mainlines		
Main telephone lines in operation ('000)	610.0	1,787.0
Per 100 inhabitants	1.00	2.49
Main telephone lines installed ('000)	549.2	3,352.8
Per 100 inhabitants	0.91	4.66
Cellular subscribers per 100 inhabitants	0.06[a]	1.33
Public payphones per 1000 inhabitants	0.08	0.12
Telephone tariffs (real terms)[b]		
Connection (peso)		
Residential	292.70	199.88[c]
Business	354.80	248.84[c]
Monthly Subscription (peso)		
Residential	200.36	158.11[c]
Business	577.08	362.03[c]
International Telephone Traffic		
Total int'l outgoing (million minutes)	107.0	192.6
Minutes per inhabitant	1.8	2.7
Telecommunication Investment		
Total (US$ million)	361.2	834.5
Per inhabitant	5.9	11.6
% of revenue	67.3	76.5
% of GFCF	2.99	4.8
Service Quality		
% of Satisfied demand	56.7[d]	66.5
Waiting list for tel lines ('000)	576.3	900.2
Waiting time	5.5[d]	2.9
Faults per 100 main lines per year	237.2[e]	131.6
% of digitalized lines	7.0	85.0

[a] 1991.
[b] deflated using consumer price index (1990=100).
[c] 1995.
[d] 1994.
[e] 1992.
Source: International Telecommunications Union, National Telecommunications Commission (for main telephone lines installed).

operation, and at least 51 percent by the 15th year. Only si telecom companies are currently listed in the Philippine Stoc Exchange, two of which are thinly traded.

The failure of some carriers to meet their commitment raises concern that many of the targeted areas will remai unserved when SAS terminates. As of the end of 1997, onl 596 out of 1,398 targeted cities and municipalities have loca exchange service.[24] This is despite the standing policy requirin carriers to install at least one line in a rural area for every 1 lines installed in an urban area.[25]

As a remedial measure, the National Telecommunication Commission (NTC) granted three other service providers th provisional authority to offer services in still unserved an underserved areas.[26] This brings to 13 the total number o local exchange carriers. The NTC also allowed the Internationa Communications Corp. (ICC), among the early compliants t SAS, to expand operations beyond the service areas originall assigned to it.

To connect the remote areas, the government is settin up satellite-based public calling stations in areas where fixed link network is cost inefficient.[27] The project however ha been held up by the delay in the installation of a satellit network that would form the backbone of these stations. Th Philippine Satellite (PhilSat) Network project is a join undertaking of the government and a local service provide Capitol Wireless Inc. (Capwire) to put up 56 satellite dis stations by the end of 1995.[28] These stations are to b integrated to the existing 30 earth stations owned by Capwir The network of 86 earth stations will then be connected to a Indonesian-owned network of satellites to allow it to receiv

---

[25] To address this deficiency, the Department of Transportation ar Communications (DOTC) launched "Telephono sa Barangay," a project that w install telecommunications centers in remote barangays. The project will be funded l foreign loans.

[26] These are Eastern Telecommunications Philippines, Inc., Be Telecommunications Philippines Inc., and Philippine Communications Satellite Cor (Philcomsat). They were granted authority to put up a local exchange network in 199 1997, and 1998, respectively.

[27] This is mandated by Municipal Act of 1989 (RA 6849).

[28] Only 15 stations have been installed as of the first quarter of 1998 ("Gov admits PCO delays in remote areas," Business World, 20 April 1998, p. 6).

[29] DOTC Circular 93-273 and NTC Memorandum Circular 10-7-93.

and send voice, data, and video communication signals.

Market reforms extended to satellite services. Two carriers, Philippine Communications Satellite Corporation (Philcomsat) and Domestic Satellite Philippine Corporation (Domsat), had monopoly on international and domestic satellite services, respectively, until 1989. Initially, the NTC granted authority to put up satellite communications to five other carriers (that included Capwire and PLDT). Market entry to domestic satellite communications was finally liberalized in 1993,[29] and to international satellite, a year later.[30] Enfranchised telecommunications entities and broadcast service providers are now allowed to establish direct access to all international fixed satellite systems. The government has also permitted the operation and use of Global Mobile Personal Communication by Satellite (GMPCS) and the reception of Direct to Home (DTH) TV services.

As for cable TV, licenses have been liberally handed out, resulting in competition of two or more cable TV operators in the same service area. There are 849 cable operators nationwide as of the end of 1997. Efforts to rationalize the fragmented industry led to the issuance of Executive Order 436 that vested the regulation of the industry with the NTC.

Without doubt, the above market reforms ushered in an era of robust growth and expansion of services, notably the internet. Varying degrees of competition have been introduced in almost all services. In addition to 13 local exchange carriers, there are five cellular operators, nine international carriers, and 14 paging companies. Competition improved service quality and stimulated investments as evidenced by the quality and investment indicators shown in Table 2. It also eroded profit margins that compelled incumbents to trim down their organizations in order to raise efficiency.[31]

While full liberalization awaits the telecommunications sector, some barriers to convergence are worth noting. The biggest barrier of course is the geographical segmentation of markets imposed by the Service Area Scheme. This prevents economies of scale from being realized, resulting in higher unit

[30] DOTC Circular 94-277. The provisions of said circular were signed into Executive Order No. 467 in 17 March 1998.

[31] Efficiency is measured by the number of lines per employee.

[32] R.A. 7925

Table 3
Multimedia Access, 1996

	Telephone (per 100 inhabitants)	Internet Users (per 10,000 inhabitants)	Cellular Subscribers (per 100 inhabitants)	TV (per 100 inhabitants)	Rank
US	63.99	787.82	16.52	80.6	1
Sweden	68.21	904.67	28.18	47.6	2
Denmark	61.79	570.13	25.02	53.3	3
Canada	60.24	667.48	11.41	70.9	=4
Australia	51.88	1092.18	20.83	66.6	=4
Japan	48.92	556.61	21.39	70	6
Switzerland	64.04	521.13	9.33	49.3	7
UK	52.76	429.97	12.23	61.2	8
Hongkong	54.69	475.36	21.58	38.8	9
Netherlands	54.33	580.01	5.18	49.5	10
Austria	46.89	372.25	7.43	49.6	=11
Germany	53.84	305.21	7.07	49.3	=11
Singapore	51.33	492.72	14.12	36.1	13
France	56.36	85.65	4.22	59.8	14
Israel	44.09	434.07	18.23	30	15
Greece	50.87	143.2	5.25	44.2	16
Belgium	46.52	295.3	4.71	46.4	17
Italy	44.01	101.92	11.19	43.6	18
Spain	39.25	133.69	3.33	50.9	19
Portugal	37.49	231.53	6.68	36.7	20
Taiwan-China	46.62	139.72	4.52	36.2	21
Korea (Rep.)	43.04	131.74	6.98	32.6	22
Hungary	26.06	97.92	4.63	44.2	23
Czech Republic	27.31	193.89	1.94	40.6	24
Malaysia	18.32	31.07	7.39	22.8	25
Poland	16.91	124.23	0.56	41.8	26
Argentina	17.38	31.23	1.61	34.5	=27
Chile	15.59	97.09	2.33	28	=27
Russia	17.54	40.61	0.15	38.6	29
South Africa	10.05	145.78	2.25	12.3	30
Turkey	22.36	18.78	1.26	30.9	31
Brazil	9.57	31.67	1.58	28.9	32
Venezuela	11.74	8.81	3.52	18	33
Mexico	9.48	29.01	1.1	19.3	34
Thailand	7	13.33	1.54	16.7	35
China	4.46	1.22	0.56	25.2	36

Philippines	**2.49**	**5.56**	**1.33**	**12.5**	**37**
Indonesia	2.13	4.06	0.26	23.2	38
India	1.54	0.85	0.03	6.4	39
Overall Average	**12.88**	**91.89**	**2.46**	**23.8**	

Source: International Telecommunications Union.

costs, and hence tariffs. High prices for telecommunications services curb demand, and therefore holds back the delivery of innovative services. Moreover, carriers are restrained from formulating unified strategies to address market needs.

Current restrictions on cross-sector service provision preclude experimentation on convergence. Concretely, separate franchises are required for telecommunications and broadcasting, although there is no explicit limitation on cross-ownership.[32] Telecommunications providers and broadcasters are also prevented from operating cable television system without a separate license.[33]

It should be noted that even as legal monopolies have been abolished, control over the bottleneck facilities (the local loop, in particular) still rests on the dominant carrier, PLDT. The fact that PLDT is vertically-integrated poses threat to competition at the service level unless universal connectivity is assured.

3. Breaking Grounds for Technological Convergence

The critical value of technological convergence to less developed countries is the vast channels to information that it opens up. There now exist less expensive and innovative communication systems that can link up consumers in all strata of society. Still, a wide gap separates information-rich from information-poor countries. Table 3 shows the limited access to multimedia services that the Philippines still has even in comparison to other countries of similar level of economic development. The imperative to leverage technological convergence is clear.

To catch up in the information race, the government pins its hopes on market liberalization to spur infrastructure

[33] E.O. 436.

[34] A bill drafted by Rep. Simeon L. Kintanar.

development. For this reason, the Philippines has joined 68 other WTO states that have pledged to open market access (which includes removing caps on foreign equity participation) and to relax national treatment (i.e., discrimination in favor of domestic suppliers) in telecommunications services. Sectors to be affected by such commitment are the local, long-distance and international voice telephone services, data transmission, and terrestrial mobile services.

While the forthcoming liberalization is likely to boost infrastructure, what will facilitate convergence is the passage of the Convergence Bill[34] which is now the subject of deliberation at the legislative body. The proposal seeks to eliminate prohibitions on cross-sector ownership and cross-sector service provision that are vestiges of the old technological paradigm. Specifically, it permits "all companies, authorized or enabled to furnish telecommunications, broadcast and value-added services...to provide multimedia services, i.e., the furnishing of simultaneous transmission of text, voice, video, and data over existing or new communication facilities."[35]

The bill is expected to stimulate competition between industries vying for dominant position in the multimedia market namely, telephony, cable TV, wireless communications broadcasting, computing, and even electric utilities.[36] This will certainly hasten infrastructure development. More importantly, open competition between network operators can effectively temper the dominance of the incumbent carrier as a wide range of technical alternatives to communications is made available. Thus, there can be no objection to removing boundaries that have been rendered redundant by technological change. If any valid disagreement with the bill were to be posed, it cannot be based on the principle of liberalization, but only with respect to the sequencing of reforms.

Some key reforms can be made preconditions to, or pursued simultaneously with, the lifting of cross-sector

---

[35] A draft version of the Convergence policy prepared by the Department of Transportation and Communications (DOTC) is less liberal. DOTC's version encourages telephone and cable TV operators to share a common network infrastructure. The policy however explicitly prohibits a local exchange carrier from owning and controlling a cable television company, and vice-versa.

[36] It is anticipated that electric utilities will become telecommunications service providers in the future.

boundaries. The first is regulatory simplification. This calls for application of uniform rules on ownership and licensing to all competing industries in the interest of fairness. The cable operators group has rightly pointed out that differences in ownership rules and franchising requirements for telephony and cable TV systems is antithetical to the convergence policy. Hence, they suggest that the 40 percent foreign equity cap applied to telephone companies replace the current 100 percent Filipino ownership rule currently imposed on cable operators and VANS providers. It is natural for telecommunications operators to oppose this proposal, especially those who foresee a potent threat emanating from cable operators should the latter obtain a stronger capital base. Indeed, overcapacity in cable TV networks is a future source of competition for incumbent telephone operators if free capacity can be used for telephony. However, if competition is to be effective, it is essential that barriers to competition be removed and service providers be given equal opportunity to cross over into different kinds of content.

Second, appropriate safeguards against monopolistic tendencies of dominant players must be put in place. Specifically, a strong anti-trust legislation is required to block takeovers, mergers, and other strategic moves of dominant players which would deprive consumers of choice of network or service provider. The guiding principle is to promote competition by preserving diversity in facilities and services. This concern assumes importance in the wake of mergers and acquisitions that is expected to follow from the recent PLDT-Smart buy-out.[37] In less developed countries where effective barriers to cross-border supply of services exist, few have resources and market power to straddle across services. Hence, the market is vulnerable to domination. The regulator therefore assumes a complex task of assessing which integration or alliances foreclose competition, and which ones are responses to technological convergence. In telecommunications, it is not sufficient to introduce opportunities for competition, nor is competition a self-perpetuating process. Rather, effective competition is to

[37] In the last quarter of 1998, the controlling stake in PLDT was acquired by HongKong-based First Pacific Ltd., an investment group that also wields control over Smart, Inc. This consolidation is expected to reshape the industry and trigger mergers among smaller players.

be created and constantly checked.

A third area of reform is the interconnection of networks Effective competition is created through interconnection, bu this is difficult to achieve given the inherent conflict of interest between a network owner and a rival service supplier. The challenge is to prevent the owner of bottleneck facility from discriminating in favor of itself. Some measures have been suggested to ensure fairness and sustainability of competition transparency and standardization of interconnection charges placing the onus of proof on the incumbent to show fair allocation of costs; and developing an "efficient operator" yardstick Despite this, resolving the interconnection rows remains a regulator's conundrum. The problem will only be magnified and tangled when network access is open to many. Thus, a rethinking of the existing contractual approach to interconnection is suggested here for two reasons: commercial equality and mutual benefit from interconnection will rarely hold in multimedia and the modes of interconnection will be much more complex In addition, more active supervision of the regulator is necessary at least at this stage when the industry is still dominated by single supplier. With convergence, the interconnection o networks becomes doubly critical as it is not only important t competition, but also to the smooth functioning of an information highway.

Fourthly, correct pricing is crucial in developin information-based services. In the long-run, telephone operator may have difficulty competing against cable and computer based networks unless they shun usage-based pricing in favo of access-based. Flat-rate pricing is perceived to have fostere the growth of internet. In view of the abundance of capacit as a result of convergence, the pricing structure that woul likely evolve is one based on the value, instead of amount, o what has been sent and received, and on the access to network rather than on the level of usage. Until now, local carriers hav opted for flat-rate tariff. It is fortunate that they have not bee dependent on usage-based pricing unlike their foreig counterparts. This may however change when PLDT implement local metering and restructures the tariff based on the time o call. But a shift to usage-based pricing now is clearly inopportun

Finally, network competition as a result of convergenc

[38] See Abrenica and Ables (1999).

does not guarantee that essential telecommunications services will reach rural and high-cost subscribers. Moreover, it is almost certain that cross-subsidies, the traditional fund source for universal service, will be swept away by competition. The regulator should therefore consider delinking access deficit contribution and universal service, and setting up alternative funding mechanisms for universal service. One such mechanism that has been gaining support is the universal service fund (USF). Unlike access charge, the fund does not distort prices and distributes the burden of universal service equitably among competing providers. Other funding options exist and their merits have been expounded.[38] The bottomline is that the regulator should find innovative means of ensuring universal service even as it increasingly forfeits many of its traditional roles in the marketplace.

4. Regulatory Signposts

As technological convergence takes fuller form, a wave of mergers, consolidation and alliances, both at the global and national levels, is expected to engulf the information sector. Already, the past years have witnessed the forging of strategic corporate alliances (e.g., Global One, a partnership of France Telecom SA, Deutsche Telekom AG and Sprint Corp.; World Partners, an alliance between AT&T, KDD, Singapore Telecom, Telstra and Korea Telecom; and recently, the British Telecom and AT&T tie-up[39]) and of cross-service linkages (e.g., Microsoft and NBC, British Telecom and BSkyB Cable, AT&T and IBM). These consolidations are generally motivated by the need to integrate and harness the technologies that the different networks have developed separately.

A digital-based integrated network will soon supplant the separate communications networks that presently exist. As a result, the vertical divisions that distinguish telecommunications, broadcasting and computing will have to be redrawn to reflect changes in technologies and markets. It

[39] Analysts predict that the BT-AT&T union will be used as vehicle for these global players to enter the Asian telecommunications market. The two agreed to merge their transborder operations and assets. ("BT-AT&T union seen buying into Asian telecoms market," Manila Standard, 29 July 1998, p. 6)

will probably matter less how one service will be classified. In this case, the issue of whether voice over internet is voice telephony becomes trivial. It will be more useful instead to separate conveyance from service and content provision. When this happens, regulation will have to be recasted accordingly.

Technological advances in the future are expected to submit many telecommunications operations to the discipline of the market. Minimum regulatory intervention will be needed, basically to secure consumer interests amidst the market's pursuit for economic efficiency. There will however be a greater role for "global" regulators in issuing standards and protocols that will ensure global connectivity of networks.

Meanwhile, the transition to a fully digital age has to be managed. In the face of fast evolving technologies, flexibility in regulation should be the observed norm. A set of temporary, self-extinguishing arrangements is preferable to immutable rules. The soundness of traditional rules must be consistently checked with the new order. More importantly, the regulator should be able to get rid of the baggage of the past regime – that is, to clip the market power of the dominant supplier.

References

"A Survey of Telecommunications: A Connected World," *The Economist,* 13th - 19th September 1997.

Abrenica, M. J. "A Note on the Regulatory Environment in the Telecommunications Industry." In C. Paderanga, Jr., ed. *Emerging World Environment.* Forthcoming.

Abrenica, M. J. and A. C. Ables (1999). "Rethinking Universal Service." Paper presented during the 4th Regional Ethics in Leadership Conference, 10-14 February 1999, Port Dickson, Malaysia.

Cable, V. and C. Distler (1996). *Global Superhighways: The Future of International Telecommunications Policy.* Royal Institute of International Affairs.

Department of Transportation and Communication (1993). *National Telecommunications Development Plan, 1991-2010,* July 1993 update.

European Commisssion (1997). "Green Paper on the Convergence of the Telecommunications, Media and

Information Technology Sectors and the Implication for Regulation Towards an Information Society Approach." Brussels, 3 December 1997.

ieve, W. and S. L. Levin (1995). "Strategies and Policy for Local Telecommunications Competition," *Industrial and Corporate Change,* 4(4) 683-690.

.ring, J. (1995). "Can Local Telecommunications be Self-Policing?" *Telecommunications Policy,* 19(2) 83-89.

:ernational Telecommunications Union. *1995 World Telecommunications Development Report.*

:ernational Telecommunications Union. *1997 World Telecommunications Development Report.*

tzer, M. (1996). "Cable TV in Austria," *Telecommunication Policy,* 20(4): 291-301.

pschitz, B. (1998). "Regulatory Treatment of Network Convergence: Opportunities and Challenges in the Digital Era," *Media Law and Policy,* 7(1) 14-23.

elody, W. H. (1996). "Toward a Framework for Designing Information Society Policies," *Telecommunication Policy,* 20(4) 243-259.

.tional Telecommunications Commission. *1997 NTC Annual Report.*

chol-Nixon, C. L. and D. Jasinski (1995). "The Blurring of Industry Boundaries: An Explanatory Model Applied to Telecommunications," *Industrial and Corporate Change,* 4(4) 755-768.

)ll, R. (1995). "The Role of Antitrust in Telecommunications," *The Antitrust Bulletin,* Fall 1995, 40 (3) 501-528.

lomon, J. and D. Walker (1995). "Separating Infrastructure and Service Provision: The Broadband Imperative," *Telecommunication Policy,* 19(2): 83-89.