

Viewpoint

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Telecommunications Is Dead, Long Live Networking

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The effect of the information revolution on the telecom industry

Powerful forces are recasting the business world in a fleetier, more competitive form. These forces, largely grouped around information infrastructure and new communications technologies, have come to be known collectively as the information revolution. This Note is the second in a series of five that looks at this revolution and the future of telecommunications.

Economic history teaches us that no industry is immune to change. Canals gave way to railroads, which in turn bowed to road transport when the cost of motor vehicles fell enough to make it more cost-effective. Banks are scrambling to adjust to a world in which debt can be raised on bond markets and consumers can obtain many traditional banking services online. And the telecommunications giants, which have reigned supreme for the past fifty years, are being besieged in their turn as the information revolution overturns the certainties on which their strength is based.

The threat to the giants arises from the huge decline in the cost of communicating, the increase in the power of computing, and the shift to digital technology (Viewpoint 118). These forces have led to industrial convergence as communications and information services (such as basic telephone service and cable TV) have been delinked from their delivery infrastructures (the telecommunications and cable networks). With the delinking has come increasing overlap between the two main components of the communications industry: common carrier conduit systems (delivering telephony) and content-based information sources and technologies (broadcasting). As a result of these changes, new competitors are emerging from unexpected directions, and the market domination on which telecommunications companies base their strength is melting away.

BOX 1 WHAT IS THE TELECOMMUNICATIONS INDUSTRY?

- **TELECOMMUNICATIONS INFRASTRUCTURE has three main components: terminal equipment, such as telephones and fax machines in users' homes and businesses; the local loop, generally a pair of copper wires connecting the terminal equipment to switching equipment in the local exchange; and long-distance or international transmission networks, made up of fiber-optic cables, microwave links, and satellites.**
- **TELECOMMUNICATIONS SERVICES have focused on calling services: local calls (within the local exchange network) and long-distance or international calls. Increasingly, however, these basic services have been augmented by the transmission of data in binary form and by value added services (such as call waiting and Internet access), which increase functionality for the end user and generate supplementary income for the telecommunications operator.**

The economics of telecommunications

New technology has profoundly altered the industry's cost structure, and as a result, the existing structure of the industry and its pricing methods have now become incoherent. The end of natural monopoly, the trend toward new pricing structures, and the increasing competition and globalization in the industry are forcing radical change.

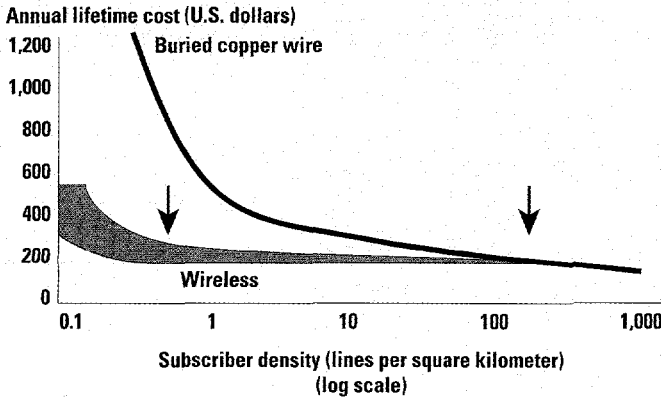
The end of scale and natural monopoly

In a conventional wired network, most of the investment goes to establish the local loop, particularly the civil works needed to extend the network to the end user. About two-thirds of the assets on the balance sheet of telecommunications operators are "holes in the ground"—



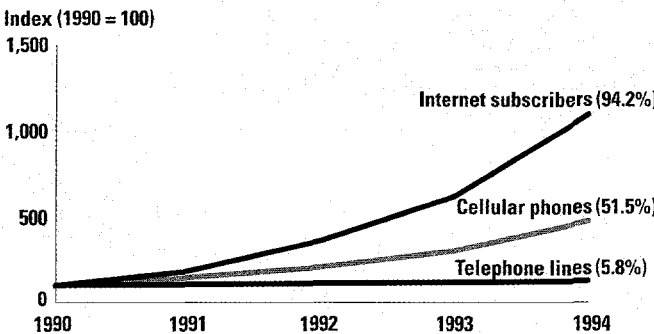


FIGURE 1 BURIED COPPER WIRE GIVES WAY TO WIRELESS IN LOCAL LOOP AS TECHNOLOGY DRIVES COST DOWN



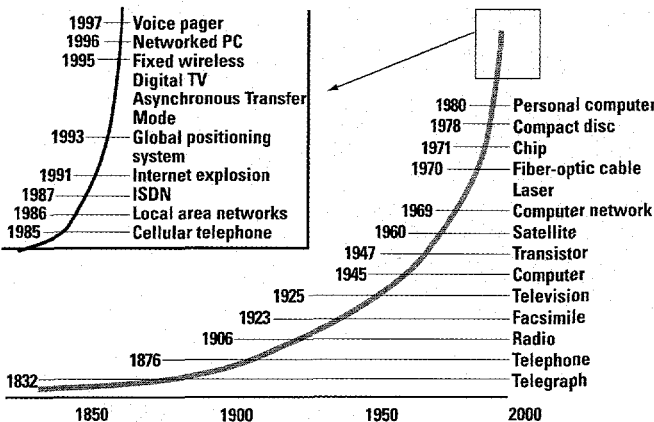
Source: Coopers & Lybrand data; European Bank for Reconstruction and Development data.

FIGURE 2 WORLDWIDE EXPLOSION OF NEW SERVICES



Note: Figures in parentheses are annual growth rates over the period shown. Source: World Bank and International Telecommunication Union data.

FIGURE 3 EXPLOSION OF NEW TECHNOLOGIES



Source: World Bank compilation.

the trenches needed to lay the cables. Thus, in a traditional network, 70 to 85 percent of the cost of a call, even an international one, consists of the cost of the low-technology link covering only the last couple of miles.

Because in the conventional local loop based on copper wires the marginal cost of each new subscriber declines no matter how many existing subscribers there are, the telecommunications sector—or at least its local loop portion—has been considered a natural monopoly. Economic theory suggests that the best way to manage a natural monopoly is to create a regulated utility, granting it a franchise to deliver the service in exchange for certain obligations (such as non-discriminatory treatment of consumers) and regulating the prices it can charge for the end product. This explains the nearly universal model for the telecommunications sector: a local monopoly company, often a public enterprise, with regulated prices.

But wireless, cable TV, and other technologies are now challenging the conventional local loop based on wireline technology and buried copper (figure 1). In many cases, wireless is already cheaper per new subscriber than wireline. And the much flatter cost curves of wireless show that size no longer brings any real cost advantage. It is possible to have several competing providers of local service without raising the network's overall costs much. The implications are considerable: the best way to deliver service to customers is no longer through a utility but through competing providers of local telecommunications services. The existing telecommunications sector model in most of the world is simply wrong. Furthermore, the telecommunications reforms sweeping the world should focus more on the structure of the sector—providing as much potential for competition as possible—than on the transfer of the monopoly telecommunications company from the public to the private sector. In many cases, however, the reverse is true.

The move to bandwidth-based pricing

Almost universally, how much you pay for a telephone call depends on how long you talk

and how far away your correspondent is. If you are in Paris, it is much more expensive to call New York than to call Toulouse, and the price you pay (beyond the monthly rental fee for the line) is proportional to the time you talk. But that is not how costs are built up for the operators in the sector. For example, tariffs for international calls, based on the current but outdated accounting rate system, nearly always far exceed the cost of providing the service (box 2).

A second problem relates to new services. The new communications services that customers increasingly demand send varying amounts of information per second down the transmission line. Paging, for example, requires narrow bandwidth (a small amount of information per second), while new multimedia services (such as teleconferencing) require a huge amount of bandwidth because transmitting video sends much more information down the line than does transmitting sound alone. But most telecommunications operators do not offer choice in bandwidth: customers get a standard telephone line, accommodating 64 kilobits per second (kbps) in Europe and 56 kbps in the United States.

To an increasing degree, the costs borne by telecommunications operators are made up of three elements: a fixed monthly amount, which corresponds to the capital costs of the local loop; a one-time cost for each connection, corresponding to the cost of switching that call; and a transmission cost, which is proportional to the bandwidth. But actual customer charges are quite different. And because it is increasingly possible to compete for customers, new, agile operators are emerging that take advantage of the possibilities for arbitrage between tariffs and actual costs. Much of the new activity is in international service. But new players are also emerging in other areas, such as Internet service providers, which enable customers to place long-distance calls for the price of the local loop connection (figure 2).

It is safe to predict that competition and market forces will drive tariffs closer to long-run incremental costs, both in level and in structure. And within a couple of years, consumers

BOX 2 THE IMPENDING COLLAPSE OF THE INTERNATIONAL ACCOUNTING RATE SYSTEM

International tariffs are based on the accounting rate system, which was developed as part of a regulatory tradition holding that international telecommunications services are supplied through a bilateral correspondent relationship between national monopoly carriers. An accounting rate is the price the two national carriers (or their governments) negotiate for handling one minute of international telephone service. Revenues are shared between the two carriers. The accounting rate system was originally intended to allow each carrier to recover its costs for handling an international call.

The main problem with the accounting rate system is that for nearly every country the cost of transmitting a call has fallen dramatically over the past twenty years, but the fall in price has lagged this decline. As a result, the rate greatly exceeds the cost of providing the service, so accounting rates, which still assume that the sector is a monopoly, generate huge economic rents for telephone companies handling international calls. In some cases, international calls account for the entire profit of the sector and even generate foreign exchange for the government.

This system is showing signs of imminent collapse. New possibilities for competition in international services make the sector a fertile area for arbitrage—and so we are seeing significant activity in call-back services, calling cards, Internet telephony, and the like. These new sources of competition undercut the hugely inflated accounting rates and eat into the income of telecommunications operators—especially those offering the lowest prices. As a result, the U.S. regulator, the Federal Communications Commission, is seeking to replace international accounting rates with a new benchmark system based more closely on actual costs.

will probably be able to buy the bandwidth capacity they need for a given connection, which, because of declining transmission costs, will cost no more than a few cents per hour even for international calls (in addition to the monthly rental for local access).

Intermodal competition, globalization, and the WTO negotiations

Policymakers increasingly accept that competition in the local loop is both possible and desirable. But competition is also bringing changes that policymakers are much less knowledgeable



about—in the explosion of new technologies, products, and services competing with one another to deliver connectivity to the end user (figure 3). New technologies increase arbitrage possibilities for new operators, and they complicate the work of regulators. But above all, they challenge existing operators, which are often slow in responding to new customer demands.

Also changing is the geographic service area in which end users are interested—increasingly not only national but international. International traffic is growing by 12.4 percent a year, compared with 5.9 percent for domestic calls. Thus, as competition in domestic markets becomes the norm, consumers will find operators that can offer packaged services on an international scale increasingly attractive. The growing demand for international services helps explain the trend toward global alliances among telecommunications operators. But this trend may stem more from the desire of former monopoly players to recreate at the international level the oligarchies to which they are accustomed in their domestic markets than from the underlying market forces in the industry.

In an alternative future, transmission capacity and bandwidth might become tradable commodities, with a spot market on which capacity is bought and sold in half-hour slices and megabit-per-second tranches. The spot market could be associated with a futures market on which contracts would allow operators to hedge future positions. It is difficult to imagine today's mastodon operators, which now cover everything from bulk transmission to value added services, in such a world. Instead, the world would segment into wholesalers, which would invest in and sell capacity; retailers, which would be in contact with the final consumer; and traders and brokers, which would intermediate supply and demand for capacity.

But globalization goes beyond telecommunications operators. As the World Trade Organization (WTO) focuses world attention on liberalizing trade in services, policymakers are beginning to realize that opening telecommu-

nications markets to foreign investors and operators has important benefits both locally and globally. The WTO has placed telecommunications at the top of its agenda for multilateral trade liberalization (Viewpoint 120). As markets open to foreign participation, and as technology creates new markets, we can expect to see an entirely new cast of players investing in markets that are new not only technologically but also geographically.

Conclusion

The old monopoly telecommunications sector is fast disappearing. National telecommunications markets are fragmenting into a multiplicity of niche markets at the same time that national trade barriers are falling. Many new operators are emerging, each targeting the segment that best corresponds to its comparative advantage. In this new networked bit industry, offering a huge range of competing technologies and services, the future for the incumbent telecommunications companies looks increasingly bleak. Over the next decade, as the market shifts from under their feet and as new, more nimble actors emerge, we can expect the dominance of the telecommunications operators over their traditional markets to erode spectacularly. Some countries are likely to see their major telecommunications operators fail, and new players will appear that quickly become household names around the world.

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