1. Corporate and regulatory strategy for the new network century

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THE CHALLENGE OF CHANGE

For more than a century, domestic telecommunications operators have followed a classic model: a national monopoly, owned or controlled by the state, centrally managed and providing a common public network. By their very nature and tradition, these networks provided a small number of standardized and nation-wide services, carefully planned, methodically executed and universally distributed. Over the past two decades, first in the United States (US) and subsequently in much of the developed world centrifugal forces have begun to unravel this system. The driving force behind the restructuring of telecommunication markets is the shift toward an information-based economy, which has resulted in the accelerated growth and reliability of telecommunication networks as the medium for the electronic transmission of information. Especially for large organizations, the price, control, security and reliability of telecommunication networks and services became matters requiring attention. In a series of controversial and painful steps monopoly began to give way to a network of networks.

Technology is an enabler of much recent change. Projecting forward a decade or two, technology is not likely to be radically different from that which currently exists, just cheaper, smaller, faster and more widely accessed. But these trends, exponential at present, suggest much change. The period of the 1980s and 1990s was characterized by a revolution in the technology of information data processing. Historically, transmission capacity was a scarce and therefore expensive resource, and its allocation was a matter of both political and regulatory interest. But transmission modes are, too, in the midst of enormous development in optical, wireless and switching technology. Soon, a single sheath of fiber strands will be able to transmit petabits per seconds, until recently more than the entire national network capacity. Such developments make transmission capacity abundant technically, and economically, with infinitesimal marginal cost, which leads to prices that are distance and usage insensitive. As the national

backbone networks grew in capacity and reduced transmission prices, they forced the upgrade of local networks, whether by the digitization of ISDN, the frequency expansion of DSL or coaxial cable networks, the use of fixed wireless or the migration of fiber towards the end user. In consequence, networks have moved from an individualized capacity measured in kilobits to one of megabits.

Such technological options have affected industry structure. Globally, domestic telecommunications market structure had been defined by first-generation incumbent networks invariably operating as the monopoly provider. Though not always dynamic and efficient, they nevertheless had connected most households with an affordable service, and their networks had become the nervous system for entire societies. Even after near-universal connectivity had been achieved, demand continued to grow due to greater use through the application of computer communications, the Internet, economic globalization and increased customer mobility. In consequence, the telecommunications industry has been growing exponentially and annual global expenditure on telecommunications services reached a trillion US dollars in 2001.

Thus, by most measures, traditional telecommunications network operators have been highly successful, yet they remain more challenged than ever before. Rival networks have emerged, supported by liberal entry laws, technology that has lowered entry costs, and the ready availability of investment funds. In consequence, global second-generation carriers have entered telecommunications markets and are operating as common carriers and are targeting both business and residential market segments. New facilities-based entry was initially made mostly in the more profitable long-distance service markets, and more recently in local loop markets. Competitors entered using a variety of strategies, including the resale of incumbents' services, deployment of physical facilities such as cable, mobile telephony and fixed microwave networks. Entrants also used unbundled network elements and gained access via the extant local loop. Subsequently third-generation facilities-based carriers and private carriers emerged to provide wholesale long transmission to network operators and service providers. This expansion has led to the transformation of transmission service markets into a near-commodity business, with long-distance capacity often growing at a 30 per cent to 40 per cent compound annual growth rate, and with markets for capacity emerging. The availability of inexpensive capacity has also enabled forms of non-facilities service providers such as arbitragers, callback operators and Internet telephone providers to emerge. A natural next step is for these providers to become more generally integrated so that aggregate or full-service packages can be more readily offered.

Overcapacity has made the network environment cyclical in nature.

Entrants introduced such cycles into the telecommunications markets through facilities-based investment that led to excess capacity. A necessary consequence of a slowdown in network capacity investment is consolidation, and a reduction in competition and the commodification of transmission capacity, which will ultimately lead back to increased profitability. In particular, supply-side forces through liberalization have resulted in the introduction of market participants. Privatization has enabled foreign ownership of traditional carriers and international alliances have served as a prudent course of action by carriers for both market expansion and defense. Demand-side forces such as pent-up consumer need have led developing countries to seek foreign carrier investment and expertise, while large end users have sought a global communications service to match the scope of their business operations. Thus the telecommunications industry, long organized along geographic and product lines that were both a shield and a weapon, is being transformed in different directions – that is, the global trend toward expansion as opposed to fragmentation, and entry into domestic markets. These transformations represent opposite sides of the same issue: a blurring of market boundaries created through technical innovation, policy liberalization, user initiatives and entrepreneurship. The result is a complex web of overlapping network definitions, product and service markets, carrier types, technical standards, government policies, financial arrangements and co-operative ventures.

STRATEGIES FOR TELECOMMUNICATIONS COMPANIES

This environment places new demands on the management of traditional network operators to meet competition; accelerate the product cycle; lower costs; establish brand identity for quality and customer orientation; build broadband, packet and wireless networks; function in the new markets of video entertainment, Internet service and electronic commerce (e-commerce); compete on a global basis; create a new culture – all the while fulfilling traditional public obligations and being subject to many legacy rules. Can all this be achieved? It appears difficult.

- *Incumbent strategy I: Increase economies of scale.* Supply-side technology exhibits high fixed network costs and relatively low variable operating costs – the classic conditions for the presence of natural monopoly. Demand-side forces, however, suggest positive network externalities associated with large user communities are present. Clearly, there are advantages in a network being large in terms of its

size, reach and capacity. In consequence, incumbent networks have expanded horizontally. In the US the eight major regional companies have merged into two large and mid-size firms. Internationally, similar innovations have taken place.

- *Incumbent strategy II: Create global alliances.* The quest for scale, and global presence leads to international expansion and the creation of alliances with other carriers. Several approaches have been adopted, they include: *loose marketing alliances* like World Partners (AT&T, KDD, Sing Tel and so on); *operating alliances* like Concert (AT&T and BT), *facilities-based consortia* like FLAG or traditional submarine cable groupings; and *joint equity ownership* such as Global One (DT, FT and Sprint).

  Many of the alliances were driven by the desire to gain access to otherwise closed national markets. As market access became easier with liberalization and the co-ordination of divergent corporate strategies proved difficult, another avenue for globalization emerged: *direct investment and acquisitions*. Telecommunications carriers, having operated solely in their domestic markets, now became international in scope. Carriers followed a mixed strategy, partly specializing geographically and partly following a target-of-opportunity approach. For example, Deutsche Telekom focused on Central and Eastern Europe while Telefonica (Spain) expanded into Latin America. Most large firms attempted to purchase mobile telephony networks and licenses internationally. The reasons for such trans-border direct investment varied. Reasons include, still, market access; domestic growth opportunities; liberalization of restrictions; ambitions of empire building; application of domestic expertise to foreign markets; risk diversification; an opportunity provided by LDC debt reduction; and investor expectation that operators show activity and dynamism.
- *Incumbent response III: Attempt to lower the cost curve.* Entrants had a temporary edge through the accumulated inefficiency of incumbents, but such inefficiencies declined as incumbents faced competition. Lowering of costs further is more difficult. Most new technology is available to competitors, while incumbent labor costs are usually higher than those of entrants as its workforce is more unionized, its social obligations greater and its managerial culture ingrained.
- *Incumbent response IV: Block competitors' access to network externalities.* Traditionally, incumbent network operators have tried to deny or delay interconnection to entrants and so reduce their technical compatibility. However, regulators promoting competition increasingly stymie such a strategy.

- *Incumbent strategy V: Economies of scope.* An expansion of activity can be made into new but related operations such as mobile communications, Internet access, cable TV and network operations software. More ambitious extensions are into Internet portals, transaction platforms, video content and hardware production. There are both advantages and disadvantages from vertical integration. Advantages include the potential for the extension of market power into other markets, as well as genuine economies of scope. Conversely, a specialized firm has an advantage of focus, faster product cycles and the ability to partner with firms with less conflict.
- *Incumbent strategy VI: The Internet.* Emergence of the Internet has created opportunities for high-capacity 'dumb' networks by low cost competitors and a threat to incumbents. Carrier costs are lower in an Internet Protocol (IP) system since they can shift many intelligent functions to the users and away from the expensive switching intelligence. Internet transport services are also more homogeneous than switched services and this leads to transport becoming a commodity. At the same time, the Internet also creates significant opportunities for traditional telecommunications operators to provide narrow and broadband Internet access to end users, as well as transmission, interconnection, and billing services to backbone networks and local Internet service providers. Entrants can also deploy IP-based technology for the operation of regular voice service at a lower cost.
- *Incumbent strategy VII: Restructure the organization.* Incumbent network operators also face decisions about their internal structure. They can operate as a wholesaler selling capacity and network elements to providers of final services, including to their retail business. As facilities-based competitors built local networks, it became clear how costly this option is. Thus the provisioning of this local segment is likely to be the main source of competitiveness of telecommunications organizations and a major profit center unless severely restricted by regulation.

As an alternative to restructuring, the traditional companies could become a resale and retail network, or a systems integrator. Is that likely? If an entrant, with a low-cost high-capacity architecture can wholesale capacity for less than the incumbent's cost, the latter would be making a poor business decision if it did not become a reseller. The incumbent carrier's advantage is its nationally recognized brand name: with a role to provide and not produce. To be successful, integrators must be willing to pick and choose among the low-price carriers. Similarly, the underlying low-price carriers cannot favor their own integrators.

In the extreme, telecommunications firms would outsource all operations and consist of no more than their top management. The economic advantage of such an arrangement is that the firm can reduce and transform its fixed costs into variable costs. This activity lowers the cost of entry while raising its speed. A firm can also benefit from specialized provider experience and economies of scale. The downside of this strategy is that the firm becomes dependent on other firms for critical inputs. It loses synergies that may arise from combining production with application. It may contribute, through a reduced cost of producing the input, to a lowering of costs for its competitors, too. The incumbent cannot establish a loyal workforce in whose skills it invests, and may have less of the corporate culture or institutional memory that would contribute to its long-term operation.

Most likely, network firms will be a hybrid of services and network functions. This has structural implications. Firms could become highly centralized and hierarchical, or devolve into fairly independent business units, or break-up into separate firms. The ultimate structure depends on the synergies versus the diseconomies of scope; the extent of regulation and restrictions; market power in market segments; different organizational cultures; and turf battles inside the firm. Future reorganization will not be forced on incumbents but will mostly be adopted as a matter of self-interest once monopoly status is lost. At the same time the former monopolies will acquire and integrate with other firms, in the process transforming themselves into organizations that are different from those of the past and dissimilar from one another.

Organizational change, in turn, requires cultural change. Corporate culture is based on commonality: shared history, values, goals, leadership, processes and economic interest. For more than a century, telecommunications companies operated with a culture shaped by engineering and civil service value systems and operations: clear and specified procedures; clear lines of responsibility; risk reduction; long planning horizons; job security; politicized decision making; public service orientation; national and social perspective; and management that rose slowly from within the organization. This traditional culture cannot survive the simultaneous challenges of privatization, competitive markets, globalization and convergence. The Internet culture, for example, draws from individualism, informality and risk taking. These cultures are conflicting in nature. Even where management embraces cultural change, corporate culture is much slower to alter than organizational structure, top leadership or strategy. The collective values and the way people do business change much more slowly because they are the aggregate of many behaviors and routines acquired over a lifetime. This means that extant culture is likely to inhibit organizational change.

Probably the best structural strategy to address cultural change is for the corporation to become multi-cultural. That is, the segregation and co-existence of different sub-cultures within structurally separate business units. In practical terms, it means that the traditional organization creates autonomous units whose culture and style can vary markedly. When successful in its realm of activity this new culture will reinforce itself, and might spread to other parts of the organization with the legitimacy of success and in-house origination. Should they fail, harm is confined mainly to the sub-unit, not to the entire organization. In such an environment what is the role of senior management? With operational and cultural autonomy of the sub-units, central management becomes essentially a co-ordination body for existing, newly formed and acquired companies, both domestically and abroad. In some cases such centrifugal processes might be too strong for the organization to stay together and traditional firms might disappear.

FUTURE OF REGULATION IN THE NETWORK OF NETWORKS

In the emerging telecommunications market is there any need for regulation? Many observers imagine that regulation is based on the notion of scarcity. Regulation had been essential to the old system, partly to protect against monopoly and partly to protect the monopoly itself. In the transition to competition what was left of regulation was seen as temporary, shrinking with the growth of competition. In time, regulation would eventually dissipate. Yet can the new system be expected to be totally self-regulating? In traditional telecommunication markets, regulation by government existed partly to affect the balance of power between monopoly supply and small technically ignorant end users. Regulation inserted the political and administrative process to alter unconstrained market outcomes. In return, dominant carriers, whether private or government, received protection from competition by other providers. In a network of networks this imbalance changes dramatically. Here service providers, integrators and carriers compete with one another for customers and act as users' agents toward other carriers. Service providers can protect consumers against carriers' poor performance and power, and obtain better arrangements for them. This outcome would resolve the traditional concerns of price, quality and market power. Thus, assuming that consumers have a choice of provider, and that choice is among non-colluding suppliers of underlying service, the need for government control declines drastically. But it does not disappear. Regulation persists not because bureaucrats

are unwilling to devolve power but because it exists as a political response to interest groups. Such groups will not disappear and more will emerge. Thus, what regulatory activity would be expected as a result?

A democratic political system tends to redistribution. In telecommunications markets, this has been the underpinning of policy such as universal service and rate averaging. Many believe that the efficiency of competition will shrink the subsidy to zero. True, the cost of transmission per bit will fall substantially but the consumption of bits will grow more rapidly. A larger share of household income will be expended on telecommunications services. With telecommunications services becoming more important, not having full connectivity to the new communication systems becomes a significant source of disadvantage. That is why, inevitably, the definition of universal service will expand. An early example is the introduction in the US of a favorable 'e-rate' for Internet access by schools, libraries and hospitals. In consequence, universal service redistribution will grow.

As telecommunications networks become the base for e-commerce and mass entertainment, it is unrealistic to expect that they will be treated differently from society's other transactions. Therefore, are they likely to be left alone? With e-commerce, problems of fraud, misrepresentation and theft will inevitably emerge. Entertainment services will exacerbate issues of child protection and harmful content, and an inevitable public demand for consumer protection regulation to control abuse will emerge. Since it is difficult to regulate the electronic parts of a transaction, regulation will concern physical network segments such as transmission networks and companies offering service. Part of consumer protection may therefore be imposed through telecommunications carriers and service providers who might be forced to engage in some controls over the transactions conducted through their networks.

Other regulatory issues concern interconnection. Control over interconnection was used for alternative purposes at different stages of telecommunications industry development. The initial purpose was to ensure monopoly provision, however, since the late 1960s, regulation has assured the opening of markets to competition; and more recently, to control telecommunications markets themselves. The tension between the convergent forces of technology and the centrifugal forces of business competition is most pronounced where they meet: in the rules of interconnection of the multiple hardware and software sub-networks and their access into an integrated system-wide network. As discrete networks grow, they must interoperate in terms of technical standards, protocols and their boundaries. In the networks of networks, the interconnection of networks is critical. Privacy, intellectual property-right protection and content standards are areas of continuing or expanding regulatory activity. Like it or not,

alternative forms of regulation for telecommunications networks and services will remain as control mechanisms on the electronic environment.

In dealing with market power, telecommunications market regulation is at a crossroads of regulatory strategy. Domestic local network competition for the residential consumer market appears difficult. For example, in the US the three major long-distance companies are for sale. Further, financial markets have shifted their endorsement from entrants to incumbents. This situation creates a window of opportunity for major mergers both domestically and internationally. The remaining options for policy are moving forwards, moving backwards or moving laterally. Moving backwards is to conclude that market power is permanent and regulation by traditional means, perhaps with some modern twists is appropriate. Moving forwards is to support not just competition but competitors by giving entrants certain advantages. This thrust also implies regulatory intervention. Moving sideways means relying on market forces to emerge even in the face of substantial economies of scale.

IMPACTS OF NEW GLOBAL TELECOMMUNICATIONS ON TRADITIONAL REGULATION

Among the concerns raised by the globalization of telecommunications carriers and service providers is the effectiveness of traditional regulation. Some telecommunications service providers will seek to avoid unduly restrictive national regulation, whereas other carriers are readily subject to supervision as they generate services in jurisdictions where laws are more favorable. For example, to attract business favorable laws may be enacted to provide havens for particular activities. The frictions of new industry and old regulation may extend in a variety of areas.

(a) *Pricing:* National price and profit regulation can be undermined by carriers shifting revenues and costs among jurisdictions, either in real or accounting terms.

(b) *Investment:* Varying policy on foreign investment and the market participation by domestic firms affect international investment flows. Domestic regulatory restrictions may lead to foreign investment. Asymmetric foreign ownership can lead to national leveraging of their international presence while maintaining a closed domestic market.

(c) *Content policy:* A global harmonization of content policy is undesirable due to divergent national views. Yet when a nation enforces its

own rules, the most restrictive content regulations may dominate by subjecting foreign content providers to liability.

(d) *Privacy and security:* The national protection of security and privacy of its global communications is difficult. In privacy protection, it is possible to avoid data protection laws by shifting data abroad.

(e) *Quality:* Quality standards are harder to maintain in an international transmission chain, and uniform or minimum standards may lead to needlessly high standards for poor countries. Network crashes in a country may spill across borders.

(f) *Employment:* National labor relations in telecommunications markets are affected as employment can be shifted to low wage and less unionized locations.

(g) *Standards:* Carriers operating abroad apply domestic technical standards in foreign markets leading to multiple standards.

There are several ways for countries to co-ordinate regulatory policy should they desire. The spectrum ranges from highly centralized arrangements, such as supra-national agencies with autonomous powers to a complete reliance on market forces without any real or potential inter-governmental action. Even in the absence of formal co-ordination, countries do adjust policy in response to the action of others. This reality means that, by certain countries taking a leading role in domestic policy, reform can induce others to change in order to reach equilibrium. The US, in particular by its fairly unilateral approach to liberalizing its telecommunications sector, and supplementing this stance with the use of reciprocity in determining whether to grant certain privileges to companies from other countries, has encouraged the international liberalization of telecommunications markets.

Unilateral adjustment is not necessarily effective, however, for the problems of repelling undesirable activity from foreign countries or the attraction of business by becoming a haven country. Similarly, unilateral strictness by a country can become a *de facto* international standard if it is too risky or burdensome for users to conform to different rules. As the matrix of international interrelations becomes steadily more cross-elastic, the overall tendency, in the long term, should lead to reduced regulatory strictness internationally. In this sense, liberalization is an expansionary process. It is not so much an ideological choice, but a response to an internal inability to structure a stable equilibrium that serves multiple interests and goals.

CONCLUSION

The present historic stage of telecommunications industry development is the golden age of incumbents. Incumbents have become privatized, energized, internationalized, and they play a central role in the information economy and in government high-technology policy. Incumbents also own much of the telecommunications infrastructure, and their minor competitors provide them with a regulatory fig leaf. But this golden age will not last. This age will end in a fundamental restructuring of traditional carriers themselves. Incumbent carriers are now in the midst of vertical diversification and horizontal expansion. For the traditional telecommunications firm will the future be reaction and opposition, or inspiration, motivation, reorganization and innovation? Markets are going through arguably the most creative period in telecommunications business history. Telecommunications market entrants might not be successful in the short term but they have created an important legacy. Entrants have forced incumbents to become more efficient, introduce new technology and respond better to consumer needs. They have created a regulatory structure that will enable them to return with a mechanism for financing entry, and a different mindset and style. In the process, entrants and traditional network operators will evolve into a new network economy, less competitive than many hoped for but more competitive that the monopoly system. Regulatory policy needs to ensure major companies become rivals rather than partners. In this process Schumpeter's creative destruction of capitalism moves to its next level.