

# Entrepreneurship and Government in Telecommunications

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## *Introduction*

Entrepreneurship is usually seen as the solution to the key structural problem bedeviling traditional economies in which large and sluggish firms are protected by a subservient government. Entrepreneurs breach these walls and bring forth innovation and efficiency. Joseph Schumpeter's metaphor of the creative destruction of capitalism thus became a governing cliché, even though Schumpeter himself had not singled out small entrants as the destabilizing agents. In the classic view, government is a tool of established firms, and its laws and regulations favor the entrenched incumbents. If the legal barriers were removed through deregulation, the economic barriers set by the incumbents would tumble like the Berlin Wall after the withdrawal of Soviet tanks. This notion – of government protecting incumbents from entrepreneurs – widely prevails. But is it correct?

The subject of entrepreneurship is too large to fit generalizations. One should look at it on a sectoral level, and this article will do so for telecommunications. It concludes that entrepreneurial firms exist in this sector not *despite* of government but rather *because* of it. That is, for all the creativity of entrepreneurs, the unconstrained market equilibrium the telecom sector would not likely have much room for entrepreneurial firms. Instead, it takes continuous governmental supportive policies to create and maintain room for viable entrants and participants. Therefore, without entrepreneurship *policy* only little actual *business* entrepreneurship would survive in telecommunications. This is a conclusion reached with much reluctance, since the author has supported competition in his writings and as a policymaker. But a realistic view might help protect us from future policy miscalculations that equate deregulation with an easing of entrepreneurial entry, when in fact it might have the opposite effect.

## *Monopoly and Entrepreneurship in Telecommunications*

The problem of an anti-entrepreneurial market structure goes back a long time. Although and despite the fact that Samuel Morse and Alexander Graham Bell were quintessential garage inventors, the terms “entrepreneurship” and “telecommunications” almost immediately parted company for a century. Telecommunications became a huge sector, dominated in the US by the world's largest private company, AT&T. After AT&T's early patents ran out, the company cemented its position by sharing its dominance with the emerging small independent local firms that operated in mostly rural areas and which did not compete with it. AT&T's stick was the granting of interconnection into its national and local networking; its carrot was the enforcement of the respective local monopolies of independent firms. The ensuing system was, to an extraordinary extent in equilibrium—economically, socially, politically, technologically. Phones worked well, especially in comparison with the rest of the world. Service was available and affordable, from Manhattan to Alaska. Service orientation was strong. Reasonable efficiency prevailed, especially in contrast with the state-owned systems elsewhere. Technological progress was steady, with the Bell Labs a well-funded magnet for talent. Technical standards were the same throughout the country and made interoperability easy. Shareholders were happy, and AT&T stock was a favorite blue chip for orphans, widows, and endowments. Unions were strong, cooperative, and well paid. The national security establishment, using the Bell system as

a key resource, was among its strongest supporters. The company's undeniable power was moderated by regulation, and the regulators' power was moderated by its decentralization among federal and numerous state jurisdictions. Overall, it is difficult to conceive of another sector in the American economy into the 1970s, in the public's mind, that functioned better and more harmoniously.

One generation later, the telecommunications sector stands transformed. AT&T is a shadow of its former self, after a fourth (or is it the sixth?) divestiture. Its former equipment arm Lucent is barely skirting bankruptcy and foreign ownership. Half of the regional Bell companies have disappeared. The survivors have ballooned into entities almost as large as the old AT&T that had been seen as too unwieldy, yet without that company's full range of services. New companies fared even worse: most entrants, whether in long distance or in local service, were on the ropes. Shareholders absorbed vast losses. Unions were weakened. Standards proliferated, especially in new technology such as mobile telephony. Consumers were confused. And government was using telecommunications as a cash cow for its budget deficits through the extraction of huge spectrum fees. Where competition exists (for broadband internet services) it is among traditional monopolists (telephone DSL vs. cable modems) rather than by entrepreneurial entrants.

In interpreting the change, one should be neither nostalgic for a past golden age that never was, nor look at the present through rose-colored glasses, nor ferret in closets for dark conspiracies. What happened to upset the equilibrium of yore? In a word, entrepreneurship. Rarely had such a small band had such great effect. But it is not the traditional story. The entrepreneurs did not so much destabilize AT&T in the market place. They destabilized it in the policy arena.

All of AT&T's horses and all of its men could not keep the established order together, against the determined onslaught of—whom exactly? Minor companies which were not especially innovative in technology or services. Of course, AT&T was full of the inefficiency, complacency, and arrogance of a long-standing monopolist. But those things do not bring a company down unless the competitors are very effective. Among the milestone challengers, the *Carterfone* company opened the equipment market to new entrants; its product was a device that patched radio transmission into telecom networks. The company and its product soon returned to economic and technological obscurity, leaving its mark mainly in the law books. Most consumer equipment, now hails from Taiwan and Japan. On the long-distance network side, *MCI* is better known, even though it did not survive as a corporate entity. Its contribution was in marketing, however, and not in technology. And for local networks, the new carriers *Teleport* and *MFS* were rapidly absorbed into the major companies and have not been heard of again.

If the new firms failed to make a big dent, what then explains the success of these entrepreneurs in bringing the world's largest corporation to its knees? Again in one word: government. Government policy (including the courts) allied itself, after a few uncertain years, with the new firms. This meant, for example, that AT&T was required to design its network interfaces to interoperate with anybody else's consumer equipment. It had to grant its competitors interconnection into its local and long distance networks as well as, access to its customers, to its poles and ducts, and to its wholesale lines for retail resale. Then, in 1982, it was dismantled by the government in the largest forced business spin-off in history: the AT&T divestiture. Subsequently, government policy expanded the entrants' rights to access physically the switching facilities of the established successor "Baby Bell" companies, to interconnect into them at favorable prices, to obtain favorable wholesale prices for resale, and to get access to unbundled network elements.

The regulatory support was not without federal zigs and zags as well as foot dragging by some states. But it is fair to conclude that without the protective umbrella of government and without regulation, relying purely on general commercial and anti-trust laws, entrepreneurs in telecommunications networks would have been in dire straits. Left to itself, AT&T would have either prevented their emergence, denied them access to users and technology, or bear-hugged them into cooperation as it had done with the network entrants in the

early 20<sup>th</sup> Century.

It is interesting to speculate where entrepreneurial entrants might have survived. In the equipment field, it is likely that AT&T would have relaxed its grip somewhat with the variety of equipment options emerging worldwide, and would have focused on network utilization rather than on full equipment control. New companies would have emerged as suppliers of specialized equipment, often with close ties to the computer sector. Consumer electronics companies would have provided mass products such as answering machines or low-end fax appliances. AT&T would have kept control over network equipment, with occasional niches for specialized equipment under its sufferance, since it would have been the standard setter and predominant buyer. For newer value-added and Internet services, AT&T would have dominated the ISP market, with Internet connectivity merely another service option. Value-added networks, portals and e-commerce merchants would have been mildly encouraged by the network monopoly as generators of traffic but operating under its often restrictive user policy.

However, when it comes to networks themselves, it is hard to imagine significant rival entrants surviving, including in mobile telephony, without an umbrella of governmental protection. Even for the cable TV companies and their networks, the most likely scenario of a *laissez-faire* market would have been for them to be swallowed by the national telecom monopoly.

And with network dominance remaining with one company, or even a series of parallel regional monopolists, any entrepreneurial efforts in equipment, value-added and information services, and applications would have had to come to terms with the provider of their network lifeline and its aspirations for vertical control.

Why did this scenario of AT&T dominance not happen? Why did government policy side with the weak bands of entrepreneurs instead with the well-heeled troops of AT&T, which were marching in lockstep with much of America? Why could AT&T not simply capture the regulatory system and then charge consumers for the cost of doing so?

There are several possible explanations. The first is anti Big-Business ideology. For much of its history, America has loved competition but disliked its winners. The trust busting of Standard Oil, the fragmentation of banks and broadcasters, and the regulation of railroads—all are elements of a political perspective that spanned from the political left to the small-business right. Being leery of the world's largest corporation was hence natural. The flip side was the hold that entrepreneurship exercised over the American mind. Politicians reveled in it. Academic economists extolled it. Thus, the anti-establishment sentiments of the late 60s merged with the Chicago economics of the 70s into the Washington politics of the 80s and beyond.

A second reason was the recognition by regulators that they could improve their position and power by supporting competitors. Facing a monopoly, regulators are in an uncomfortable position if they carry no clubs to make the monopolist toe the line. With competitors, information is being developed by adversary sources, and regulators become judges between rival claimants rather than enforcers out on a limb. Related was the fact that American telecommunications regulation was not a centralized affair. It included, on the federal level, the FCC, the Justice Department, The Commerce Department, the Pentagon, the Courts, Congress, and other parts of the Executive. On the state level, 51 public utility commissions (often directly elected) and legislatures had their own perspectives and powers. Hence, telecommunications policy in the US has never been a neat battle, but a series of endless skirmishes. It was easier to destabilize such a decentralized system than one where a coherent national legislation would have been required, as was the case in Europe.

The third reason was that the entrepreneurs, though weak, had business allies. These were, to some extent, the new electronic industries associated with computers and mass communications that were outside the orbit of AT&T's telecom empire, fearing its expansion and coveting its market. These industries included established players like IBM and RCA, but also the newer firms in the ascending Silicon Valley. However, much more important allies to new entrepreneurs than equipment rivals were the big *users* of telecommunications services. As the size and scope and reach of firms grew, so did the importance of information flows and communication. Telecommunications became a major cost item and subject for managerial attention; specialized corporate telecom staffs emerged. And one thing they noticed quickly was that they were contributing disproportionately to the American telecom system. That system kept consumers and rural customers happy by overcharging business and urban customers. These users accepted their lot in the shared coalition with a grumble, partly because telecommunications were for a while not a huge budget item, partly because all firms benefited from the widespread reach of telecommunications to every household, and partly because they had no alternative. When MCI and its progeny emerged, their basic value proposition was not that they provided better technology or service, but rather that they would reduce their customers' contribution to redistribution and diversity and the risk of putting all one's eggs into one carrier's basket. They did not so much bust a trust than split a policy coalition. They gave the subsidizing partners in that arrangement the possibility to exit and save the money. The large users pressured the government for choice and deregulation, but what they primarily sought was de-redistribution. And this is what happened indeed. Where once businesses paid more than residents for service, they now pay less.

The way to reconcile entrepreneurship and the previously existing social compact – to have one's cake and eat it too – was to believe that competition-induced efficiency gains would more than offset the negative redistributive impacts. This, in turn, hinged on the belief that economies of scale were not of a magnitude that would lead to a “natural monopoly” but permitted a competitive equilibrium. Of this, more later.

The high water mark of this approach was the 1996 Telecommunications Act. That law was proclaimed to be the revolutionary opening to full competition -- which it never was, except in the eyes of a Washington-centric press—and the guarantor and even extender of cheap universal service to rural area.

Whatever its inconsistencies, the Act stampeded an under-informed stock market into a huge telecom rally, on top of the general tech-exuberance. But from there, the drop was fast and furious. The various variants of local exchange companies – so-called CLECs, BLECS, and DLECS – are either out of business or barely alive. In long distance service, all three major carriers are in effect for sale. AT&T is breaking itself up and selling parts. Resellers lost their key role in arbitrage. Independent wireless providers have mostly been absorbed by the major telecom carriers.

Wall Street, always quick to spot a trend after the fact, has shut down telecom financing. IPOs became rare. Junk bond funding, long a mainstay for new networks, disappeared. VCs moved to the sidelines. Vendor financing, in which companies such as Lucent or Nortel funded new networks in return for orders, declined, together with the health of the vendors themselves. And for existing equities, entrant share prices dropped sickeningly in 2000/1.

What makes this remarkable is that regulatory policy, as discussed, was fairly pronouncedly on the side of the entrants. The implementation of the 1996 Act by the FCC and the state PUCs was clearly not only pro-competition but also pro-competitor. That extra step was a logical one, since without functioning

competitors there would be no competition, and government policy would fail. This made government helpful to entrants, but also a hostage to their success

And yet, even with a governmental thumb on the scales, the competitors have so far been routed. What are some of the reasons?

### *1. It is difficult to do competitive telecommunications.*

Network operations are complex. Many systems need to be in place and integrated. Infrastructure, hardware, software, customer service, payment systems, customization. Service must be operational domestically and often internationally, at lightning speed, with great reliability, with easy scalability and flexibility of configuration. None of this is easy or cheap. It became soon apparent that costs of new networks were higher than expected, from truck rolls to customer acquisition to capacity planning. And the incumbents were not passively accepting their challengers but fighting them through market responses, foot-dragging, as well as through regulatory delay. They were helped by risk-averse attitude of important customers that wanted to feel safe about whether the new network provider would be around next month.

### *2. Economies of scale are back.*

On the supply side, the fixed costs network operations tend to be high, but the variable cost of spreading the service are relatively low—the classic attributes of “natural” monopoly. On the demand side, there are positive “network externalities” of having large user communities. Put these three things together – high fixed costs, low marginal costs, and network externalities-- and there are real advantages to being large.

For a while, one could ignore these economies because the inefficiency of the incumbents masked them and provided an umbrella. Network externalities were extended to entrants through requirements to interconnect. But the inefficiency of incumbents declined with threats of competition, and eventually the advantage of large networks reasserted itself even though they were slower-moving than small entrants.

### *3. The new telecommunications network environment is not linear but cyclical.*

Cyclicity is not new for infrastructure industries. Early railroads were vastly overbuilt in the US. One could take 12 different private railroad routes between NY and Chicago alone. Most failed and were absorbed. One of the functions of slowdown is consolidation, with the aim to reduce competition and commodification and increase profitability. After profitability is restored, new entrants emerge, investments in capacity pick up, and a new boom-bust cycle emerges. These cycles are not new to many other industries. But in telecom they are an entirely new phenomenon. Therefore, the industry was unprepared to analyze patterns of capacity expansion, demand expansion, and the relation of prices to the gap. The various network companies, in the aggregate, projected long distance market shares that added up to about 250% of the market. Everybody built capacity to overwhelm competitors and gain size. In consequence, some carriers have 90% of their fiber dark (i.e., available fiber without attached electronics) and prices have dropped dramatically. Such fluctuations led to consolidations as a way to stabilize the industry.

## *The Prospects of Entrepreneurship*

The implications are that far from establishing themselves, new entrants have energized incumbents

into displaying the strength of their size and bottleneck powers. We must therefore conclude that entrepreneurship in telecommunications, even assuming that they are more nimble and innovative, is in a deep structural crisis, and that the viability of such entrepreneurship ultimately depends on government. Given economies of scale and scope, the commodity aspects of many of the services, and the network externalities for users, size matters in networks. Even where smaller networks might be possible, they would have to interconnect with the larger ones, and such interconnection is not likely to be forthcoming without regulatory intervention. Hence, a return to monopoly or at least oligopoly seems to be the result if the telecom market is left to itself.

This is true for the actual physical networks, but it also has implications for network applications and for equipment, where the economies of scale tend to be much lower. Research found that new entrant firms to the telecommunications equipment industry were on average more innovative than the large established firms, partly due to innovative reconfiguration of existing components. (Dowling and McGee 1994.) However, these products and services are dependent on using or interconnecting into the networks. They are therefore at the sufferance of the network providers which can, absent clear antitrust constraints, set conditions, favor affiliated and vertically integrated firms, etc.

There is no reason to believe that these economies are only temporary. To the contrary. One reason for the re-assertion of economies of scale is the trend towards the broadbanding of networks. Communications become largely distance and time insensitive, flat-priced, ubiquitous and always-on. More of the intelligent processing has been moving to the periphery, to users and specialized value added providers, and away from the network providers. Networks were thus becoming commodity transport facilities.

All this has implications for public policy. We are now at a cross road about telecom. Should it tip the scales further in the direction of the entrepreneurs? Or should it let market forces take over, which will lead to ever-larger established companies? The new FCC chairman wishes to end FCC review of mergers, and a Justice Department is likely to be friendlier to them. Incumbent Baby Bells have or are close to receiving approvals to offer long distance service for customers of their home markets. And the Wall Street community has shifted its financial bets and political weight from the entrants to the incumbents.

This creates a window of opportunity to major mergers. We might therefore soon reach a national market structure of only three or four telecom companies, vertically integrated into long distance, owning the major long distance companies, plus most wireless, and ISP backbones. Thus, the core of telecommunications – the network industry, a sector of some \$150 billion – will not be hospitable territory for entrepreneurs for the next few years, even as, in terms of demand, the network industry is expanding.

The problem is not one of a temporary downturn on Wall Street that will correct itself soon. The problems in telecommunications are more fundamental, and investor behavior is merely a reflection of this reality. The basic telecommunications transmission has shown itself to be a commodity business. This is why we have today a less vigorous competition than two or three years ago. Thus, it is not clear at all that all that is needed is time and patience. Economies of scale and scope are strong. And entrants need the cooperation of the incumbents. Add the three together and it is very hard for entrants to survive.

Such a pessimistic scenario should not obscure that we have just gone through a significant period of rejuvenation and innovation, arguably the most creative period in telecommunications business history, ever. The telecom entrepreneurs might not be successful, but they have created an important legacy.

1. They have forced the incumbents to shape up

2. They have created a regulatory structure that will permit them to try a comeback.
3. They have created a mechanism for financing entry
4. They have created a different mindset and style

Given the contributions of entrepreneurs, it will be useful for governments to protect their entry or at least their potential entry. This could be done, in the classic way of government-supported entrepreneurship, through policy tools such as subsidies, free trade zones, tax breaks, education, etc. But in telecommunications, all of these tools pale before the need to create a regulatory environment in which network competition becomes possible, which can then be extended to the other parts of the sector, while at the same time not guaranteeing the survival of inefficient entrants. This is a tall order.

With such an umbrella, there will be plenty of opportunity for telecommunications innovators to supply new tools and ideas. As the market keeps growing, niches open. Entrants can bundle and integrate services, find opportunities in arbitrage, or become suppliers of specialized inputs bundled by incumbents.

Thus, new entrants will find opportunities again. But given that they are riding on the coattails of government, and that government is not normally in the business of revolution, entrepreneurship will be a domesticated process, possibly creative, and unlikely destructive.

#### Bibliography

Abernathy, W.J., and K. Clark, "Innovation: Mapping the Winds of Creative Destruction," *Research Policy*, 14:3-22, 1985.

Baldwin, C., and K.B. Clark, "Managing in an Age of Modularity," *Harvard Business Review*, 75:84-93, 1997.

Birley, S., "The Role of Networks in the Entrepreneurial Process," *Journal of Business Venturing*, 1:107-117, 1985.

Butler, R.J. and M. Carney, "Strategy and Strategic Choice: The Case of Telecommunications," *Strategic Management Journal*, 7:161-177, 1986.

Crockett, R.O., and P. Elstrom, "How Motorola Lost its Way," *Business Week*, (May 4):140-148, 1998.

Dowling, Michael J. and Jeffrey E. Mc.Gee, "Business and Technology Strategies and New Venture Performance: A Study of the Telecommunications Equipment Industry," *Management Science*, 40:12:1663-1677, December 1994.

Dowling, M.J. and T.W. Ruefli., "Technological Innovation as a Gateway to Entry: The Case of the Telecommunications Equipment Industry", *Res. Policy*, 21: 63-77, 1992.

Friar, J. and M. Horwitch, "The Emergence of Technology Strategy: A New Dimension of Strategic Management," in M. Horwitch (Ed.), *Technology in the Modern Corporation: A Strategic Perspective*: 50-

85, 1986.

Hambrick, D.C., D.A. Nadler, and M.L. Tushman (eds.), *Navigating Change: How CEOs, Top Teams, and Boards Steer Transformation*, Boston: Harvard Business School Press, 1998.

Hambrick, D.C., "High Profit Strategies in Mature Capital Goods Industries: A Contingency Approach," *Academy of Management Journal*, 26: 687-707, 1983.

Harrigan, Kathryn, "The Role of Intercompany Cooperation in Integrated Strategy: Strategic Alliances and Partnering Arrangements," *Advances in Strategic Management*, Greenwich: JAI Press.

Haveman, H., "Between a Rock and a Hard Place: Organizational Change and Performance under Conditions of Fundamental Environmental Transformation," *Administrative Science Quarterly*, 37:48-75, 1992.

Hubbard, Robert Glenn, and W.M. Gentry, "Tax Policy and Entrepreneurial Entry," *American Economic Review* 90 (May):283-287, 2000.

Kamien, M., and N. Schwartz, "Market Structure and Innovation: A Survey," *Journal of Economic Literature*, 13:1-7, 1975.

Kelly, K., "New Rules for the New Economy: Twelve Dependable Principles for Thriving in a Turbulent World," *Wired Magazine*, (September): 140-197, 1997.

Low, M.B., and I.C. MacMillan, "Entrepreneurship: Past Research and Future Challenges," *Journal of Management*, 14:139-161, 1988.

Maddy, Monique, "Dream Deferred: The Story of High-Tech Entrepreneur in a Low-Tech World," *Harvard Business Review*, May-June, 2000.

Mosakowski, E., "Organizational Boundaries and Economic Performance: An Empirical Study of Entrepreneurial Computer Firms," *Strategic Management Journal*, 12: 115-134, 1983.

Noam, Eli M., "Interconnecting the Network of Networks," MIT Press, Massachusetts, 2001.

Pages, Erik R., "The Telecom Crash: A Meltdown or a Healthy Pause?" 30 May 2001. At <http://www.entrepreneur.com>

Porter, M.E., *Competitive Advantage*, New York: Free Press, 1985.

Schumpeter, J.A., *Capitalism, Socialism and Democracy*, 3d ed., Harper and Row, NY, 1950.



Shapiro, C., and H.R. Varian, *Information Rules: A Strategic Guide to the Network Economy*, Boston: Harvard Business School Press, 1998.

Stein, T., "Innovative Late Entrants Outsell Pioneers," *Journal of Marketing*, 35:54-81, 1997.

Tapscott, D., *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, New York: McGraw-Hill, 1995.

Triendl, Robert, "France Acts to Spur Tech Entrepreneurship.," *Research Technology Management*, 42:2:5-7, March/April 1999.

Tushman, M.L., and C.A. O'Reilly III, *Winning Through Innovation: Leading Organizational Change and Renewal*, Boston: Harvard Business School Press, 1997.

West Robert, and Michael Ivie., "A Hard Year at the Office," *Telephony*, 240:23:252-258, June 4, 2001.