

Lecture 7- Pre-lecture reading

Cellular Politics: monopoly or competition?

With the technology and the economics of cellular behind us, we turn now to the world of cellular politics, and in particular to the passionate battles over the AT&T monopoly during the long period of development. We will discuss the reasons for and against monopolies in general, and the AT&T monopoly in particular, and the long battle of the DOJ (Department of Justice) to break up the AT&T monopoly. Then we will turn to the process the FCC uses to create something new like cellular, and how it leads to long delays (especially when there is a big controversy like AT&T's proposed cellular monopoly, with many "stakeholders" involved). Finally, we will see how it all turned out.

The issue of monopoly

For 15 years AT&T fought opponents like the Department of Justice and the Motorola Corporation to create a cellular telephone monopoly, and the FCC, caught in the middle, delayed important decisions. To understand the arguments on both sides of this issue, we need to understand the characteristics of big common carrier systems like cellular. Why are some businesses allowed to be monopolies, and why do other companies and the DOJ have strong objections to such monopolies? The wars over the AT&T monopoly had been fought over many issues for almost a century, and cellular was its last and most decisive battle.

Common carriers

As the name implies, common carrier systems carry something for the public "in common" at published rates. Some are communication systems like the postal system, telephone system, and cellular systems, while others carry "bulk" commodities like electricity, natural gas or water.

By sharing a network, common carrier systems achieve good service at low cost. In general, systems become cheaper and more efficient when they are larger, and in some cases the advantages can be dramatic. A large electric system serving a million homes costs much less than it would cost a million homeowners to provide their own generators, even though an expensive distribution network is required. It is also more efficient, so it uses less fuel per kilowatt-hour. Since one operator controls the whole system, planning becomes easier and the best technology can be used. Reliability is higher as well, and in most cases the operator can be held accountable for "end-to-end" service quality.

This raises an obvious question. If big systems provide the best service at the lowest price, why not have one (monopoly) system? In fact, many common carrier systems use expensive infrastructure that can be messy to install, and ugly to look at. Installing two sets of water pipes or two electric grids or two telephone networks would seem like a bad idea to most people, so we often allow monopolies to provide these "disruptive" services. When that happens, of course, there is no competition. A monopoly could charge very high rates, so regulatory bodies have to be set up to oversee the monopoly

and set rates and limits on profit. The result is usually good service, but the resulting bureaucracy can create new types of inefficiency.

In the early days of telephony, competing companies each had their own wires from their own switching offices to their own customers, causing a huge mess and affecting calls between customers served by different companies.

Many common carriers have extensive infrastructure that's messy to build

□ Messy infrastructure

- Roads, wires and pipes



5

Bell's "system" and its opponents

A century ago, Alexander Graham Bell's AT&T (which came to be called the "Bell System") began to buy up independent telephone companies, with the goal of creating a single nationwide network. At a time when few people had private phones, he had a vision of "universal service." Creating that network took decades, and it was far more than phones and local wires. He created local telephone companies in every state, and a long-distance company that connected them into a nationwide network and to other countries. He created a "research and development" company (Bell Labs) that would design and improve all the equipment he needed (from phones to wires to telephone poles to switches) and would create breakthrough technology like the transistor and integrated circuit that would benefit the network. The transistor was created because the network needed huge numbers of amplifiers to allow long-distance calls, and vacuum tubes had a tendency to fail fairly often. He created a manufacturing company (Western Electric) with many factories to build the equipment Bell Labs designed with a good level of quality. There would always be more than a thousand independent telephone companies in the US, but most were tiny, so the Bell System controlled almost 90% of the telephone business and was a "de facto" monopoly. It eventually had a million employees and became the world's biggest company. It became a

organizational and technological model for telephone companies throughout the world, inventing and improving technology to improve service and reduce costs. The Bell System was a big success, but not everyone was happy.

Manufacturers who tried to sell equipment like telephones and switches and long-distance cables and even chips to the Bell System argued that AT&T unfairly favored products designed by Bell Labs and manufactured by Western Electric. Competitors asked the government to force the Bell System to buy from other companies, and to open the network to competing equipment. Manufacturers like Motorola, which sold “private” radio systems directly to customers like police and fire departments, and taxi dispatchers, wanted to keep the powerful Bell System out of new radio services like cellular.

The stakes were high for both sides. Even without the petitions from manufacturers, the Department of Justice had long opposed the Bell System monopoly. For the “trust busters” of the DOJ, the Bell System may have seemed less predatory than Rockefeller’s Standard Oil or the “Robber Barons” of the railroad industry, but not by much. As early as 1913, the DOJ forced AT&T to accept long distance traffic from all those tiny independent phone companies and to share the resulting long-distance revenues with them. As a result, many tiny telephone companies exist to this day.

These agreements allowed AT&T to remain a de facto monopoly and created some stability in the telephone business, but after 1950 there were a series of damaging decisions that further reduced the monopoly power of the Bell System. AT&T agreed to stay out of unregulated businesses, where its monopoly revenues could allow unfair competitive practices. It was forced to let its customers own their telephones, instead of “renting” them at a relatively high (and profitable) price. MCI was given permission to compete with AT&T in handling Long Distance calls in the 1970s, opening the door for many long-distance competitors. Radio Common Carriers were created by the FCC in the 1940s to compete with AT&T’s new mobile telephone service. These were all setbacks, but on the eve of cellular, AT&T was still a very rich and powerful company, and the future of the telephone monopoly was still an open issue. Fighting these battles would cause years of delay in creating cellular. The question was simple. Should AT&T even be allowed into the cellular business, much less be given a cellular monopoly?

The many “stakeholders”

AT&T argued that it alone had the resources in Bell Labs to design such a system and the wealth and nationwide structure to create a nationwide cellular network. Moreover, for reasons we have discussed in the previous lecture, AT&T argued that putting all the available channels in a single system would result in much cheaper service for the customers. Thus, AT&T argued that since channels were limited, the cost structure of a monopoly would best meet the FCC’s objectives for more efficient use of radio channels to serve many more customers at a much lower cost. Our calculations of required prices certainly support this argument, but other “stakeholders” would fight to prevent any new AT&T monopoly, regardless of the argued benefits to the public.

The FCC, of course, had been under pressure for years, from those who wanted more channels for many purposes. They weren’t hugely in favor of mobile telephone service, but they saw cellular, with cell-splitting and channel reuse, as a way to make any

allocation of channels for mobile telephone service last for a long time and serve a lot of users. They were less concerned with achieving the lowest cost of service for users, but that did remain a consideration.

The DOJ had been fighting to break up the Bell System for decades and opposed any new monopoly that would strengthen the Bell System.

The Broadcasters opposed having their 14 TV channels taken away and given to mobile radio. On the other hand, if they had to lose those channels, they wanted to make sure it wouldn't happen again. As a result of these conflicting objectives, they opposed the re-allocation process, but if they had to lose the channels, they preferred a system like cellular that would keep reusing the same channels and not come back for more. In fact, the dramatic growth of cable TV has made TV spectrum much less important, while cellular service has grown beyond all expectations. As a result, the broadcasters continue to give up more and more UHF TV channels to create new spectrum for cellular.

AT&T saw new services like cellular as both an opportunity and a threat. The opportunity was obvious, but what would happen if cellphones began to replace home telephones? This seemed like a remote possibility in the 1960s and 1970s when cell phones were car phones, but AT&T had a long-range vision that has turned out to be correct. If the customers could shift to a new technology that someone else provided, AT&T would be stuck with their old investment in wires and switches and phones, with less and less money coming in. Still others at AT&T saw cellular as not very important. When AT&T commissioned McKinsey (the market research company) to estimate the demand for cellular service, they famously reported that there was almost no market for cellular service (the big opportunity they saw was "paging"). At Bell Labs, cellular was seen as a wonderful problem to solve, and a chance to do something that would be important for the whole world, but even at Bell Labs no one was predicting that "everyone" would have a pocket phone in 25 years. Most engineers expected a few million users at the turn of the century. The CTIA data shows 100M users in year 2000, and 300M (i.e., "everybody") 10 years later. If Verizon and AT&T didn't offer cellular service they would be small companies today. Cellular has become their main business.

The Radio Common Carriers saw cellular primarily as a threat. Even if they got half the spectrum, could the RCCs (mostly small businesses operating a single system) manage the huge investment needed for cellular? They also disliked AT&T, their huge competitor. In fact, there would be competitors in the cellular business, but most were new. The old RCCs were not given any special advantages.

Motorola (which supplied the first "walky-talkies" in WWII) was the dominant radio manufacturer in the US, and an important supplier of radio equipment to the world. It was said to have 60%-80% of the market for the "conventional" radio systems that were used by police, fire, taxi fleets, truckers, and the military. They even supplied base stations and car phones for AT&T's existing mobile telephone systems. They were a powerful force, though in their battle with AT&T they always portrayed themselves as "David fighting Goliath". Why might Motorola have been opposed to cellular in general (not just to AT&T's proposal). Wasn't cellular an opportunity for them?

In the days before cellular, Motorola built and installed entire systems, including base stations as well as mobile units. They provided a “turn-key” service that included the equipment, the installation and testing, and even training for the users. Their customers were non-technical people such as police departments, and their sales were based as much on personal relationships as on price (dinner and drinks with the police chief, and the idea that he should “buy American”). In such an environment, competition is limited and profits can be high (almost like a monopoly ☺). Any change in the structure of the mobile radio market was a threat to Motorola. The benefit of personal relationships and turn-key services would disappear. With a big new market like cellular, Motorola might (and did) sell millions of cellphones, but they correctly saw that their profits would become much lower in a competitive environment for standardized cell phones in standardized systems. They also saw (correctly) that cellular would encourage powerful foreign competitors like the Japanese, Chinese and Koreans to enter the US market for cell phones.

Some other radio manufacturers like GE didn’t love AT&T, but some saw Motorola as a dominant and unfair competitor and supported the idea of cellular, if not the idea of an AT&T monopoly.

And finally, **the public**—those ordinary Americans who would come to love their cell phones—was generally unaware of the proceedings. When asked, they weren’t even sure what a cellular system was.

The slow FCC process

The FCC process for assigning channels is always slow, particularly for a new service like cellular, and would have caused delay in any case. In an initial “Notice of Inquiry and Proposed Rulemaking” the FCC proposed an allocation of about 1500 channels for “mobile radio” purposes and asked some basic questions. They asked if the 900 MHz spectrum was useful for mobile radio and if it should it be taken from UHF-TV. They asked which mobile radio services should receive channels, and in what amounts? They asked if new technology could get more use out of the spectrum and who should be allowed to have licenses?

Having asked these questions, the FCC set a date for interested parties to submit public “Comments.” As might be expected, the many stakeholders in a proceeding like this one will have a variety of opinions on these many questions, and many conflicting and contradictory ideas were offered. A date was then set for “Reply Comments.” Reply comments are a sort of rebuttal process, in which each stakeholder defends its earlier comments against the “erroneous criticisms” of the other participants and explains why competing proposals are misguided, erroneous, or counter to the public interest. Then there were additional Reply comments on the Reply Comments, and “Oral Testimony” as well. Oral Testimony is not a free-form discussion as the name suggests. It involves some corporate vice presidents reading carefully prepared documents written by low-level grunts. These become part of the public record, so they are much like a new cycle of written comments, except that the FCC commissioners get to ask questions. The vice presidents have been well-coached, and hopefully won’t say anything stupid. Each step in the process (written or oral) requires 3-6 months, plus the time it takes the FCC to review the material that had been filed and decide what to do next, so the years went by rather quickly.

This inherently slow process took a design process that could have been completed in roughly 5 years and extended it to 15 years. Cellular began at Bell Labs as an American idea, but the first systems would be operating in Japan and Europe before the first US system in Chicago was allowed a commercial license. AT&T's 1978 "service trial" in Chicago covered 3000 square miles and had 1000 paying customers. It was the first and biggest cellular system in the world, but it wasn't allowed to start commercial operation until 1983. In other countries, there was less opposition to telephone monopolies operating cellular systems. Systems began to operate in those countries while the US debate continued. The embarrassment of seeing those other countries offering service with a system that was originally an American idea put added pressure on the FCC to get something done.

The FCC eventually proposed two competing cellular systems per market (the local telephone company and some competitor (not necessarily an existing RCC). They asked industry to propose a national set of standards that would allow any mobile to make calls in any system. The long road to cellular was (almost) over.

This turned out to be a brief and bittersweet victory for AT&T. The Department of Justice continued its attack on the Bell System monopoly and in 1982 (when cellular systems were being approved, AT&T agreed to break up its monopoly. There would be seven Regional Bell Operating Companies (RBOCs, also called the "Baby Bells"). They would be independent of AT&T and authorized to provide local telephone service, **including one of the two competing cellular systems, in any location.**

The sad fate of the old AT&T

AT&T (the old parent company) would enter the world of competition without the Baby Bells. It was a much smaller (but still wealthy) company. It kept Bell Labs and the Western Electric factories, which were operating a number of large businesses (like manufacturing computer chips and switching machines) and would be selling cellular systems to the Baby Bells and others (for a while). It was also hoped that Bell Labs inventions would create exciting new technology businesses for AT&T. AT&T also kept its Long-Distance business and its telephone rental businesses, which produced a lot of revenues in 1982 but would shrink dramatically over the next decade. The internet would gradually replace the Long-Distance business and telephones imported from Hong Kong and China were so inexpensive that the telephone rental business slipped away.

A pattern emerged in which AT&T began to sell off its existing businesses and Bell Labs was not able to provide the new technologies that AT&T had hoped for. Much of Bell Labs and Western Electric were spun off as the new company Lucent in 1996. Lucent didn't do well either. Its stock sold for as much as \$80 per share in 1999, during the dot-com bubble, before falling below \$1 per share in the dot-com crash. Lucent was bought by the French company Alcatel, which has more recently sold it to Nokia. Many of the Bell Labs engineers who had worked on cellular for almost two decades ended up in Lucent. They continued to work on the design and manufacture of cellular systems for sale to the Baby Bells and others, but the dream of creating a nationwide cellular network was lost.

While its wealth lasted, AT&T tried to diversify into many new businesses. They bought (and later sold) a cellular company from Craig McCaw in 1994, thus returning to the

cellular services business they had lost when the Bell System broke up in 1984. McCaw was the largest of the new cellular RCCs, with a nationwide cellular operation, so (ironically) AT&T briefly became a cellular RCC. It tried to be a supplier of Personal Computers and tried to design a cell phone (in a surprising moment of self-awareness, it realized it was a decade or two behind Motorola, and gave up). It created (and for some reason sold) the Universal credit card business. It spent many billions of dollars buying cable TV operators, in the belief that the future was in the “convergence” of communications, computing and entertainment. Time has proved this convergence to be real, but AT&T was unable to make it work and sold its cable operation at a huge loss. By 2005, AT&T, like a wealthy child with a seemingly un-spendable inheritance, had squandered its wealth and was on the verge of bankruptcy. This is a cautionary tale for strategists (or perhaps, as Shakespeare poetically observed in Macbeth, it is just “a tale told by an idiot, full of sound and fury, meaning nothing.”

In another great irony, and through a series of buyouts and mergers, the seven Baby Bells (selected to compete) were reduced to two (Verizon and Southwest Bell Communications (SBC)). SBC bought what was left of the old AT&T in 2005, for only \$16B (about what AT&T spent on just McCaw), and then adopted the famous AT&T name for its entire company. Thus, the huge company we now call AT&T is really the Baby Bell SBC, and the old AT&T is a tiny part of that company (how the proud have fallen). Under the AT&T name, the Baby Bell SBC operates one of the two largest cellular networks, so perhaps the old dream of a nationwide AT&T cellular network was (sort of) realized. The new AT&T had the nationwide systems that the old AT&T had hoped for, but without the deep technical (and strategic) understanding of the system and its economics that once existed at Bell Labs. This left them vulnerable to strategic mistakes when new technologies like 2G, 3G, 4G and 5G emerged (or perhaps Bell Labs strategists wouldn't have understood the rough-and-tumble world of today's cellular systems). Great strategies aren't easy to create in a complicated world.

The journey from AT&T to AT&T

As summarized by Stephen Colbert

