

Avoiding a Tech Train Wreck

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The industry is consumed by disputes similar to those that once roiled American politics. We can avoid past mistakes.

The temperature of business reporting these days is raised by numerous disputes that lie at the intersection of technology and politics. Arguments over Internet network management involving telecommunications companies preoccupy the Federal Communications Commission. The European Union is pressuring several U.S. technology companies, including Microsoft, on antitrust grounds. Firms such as Qualcomm, Broadcom, and Nokia are involved in disputes over the use of patented cell phone technologies. Business writer Nicholas Carr lists entertainment, news, software, and financial companies as all having reason to cast a fearful eye on Google.

These battles may seem novel, a result of the frictions of the technological revolution worked by Moore's Law and its progeny. In fact, while the context is new, the underlying structure of the disputes is similar to the issues that roiled American politics a century and more ago, when the great infrastructures of transportation, utilities, telecommunications, and finance were laid down.

And therein lies a cautionary lesson. The battles of that time resulted in an armistice: the creation of regulatory structures that met immediate crises, but which also failed in many ways. These failures caused significant problems of stasis, rent-seeking, political manipulation, and corruption.

It took the great and only partly successful deregulatory effort that started in the 1970s to unchain the economy from the problems caused by the solutions of an earlier era.

As these old problems appear in new areas, or sometimes in the same old areas, the pressure to revert to the old regulatory solutions grows. Yielding to them would be unfortunate, since the same old solutions would inevitably restart the cycle of regulatory dysfunction.

So, while it is foolish to deny that the problems are real and troublesome, we should think in terms of new solutions. These could be hybrids based on contract, public commitment, and self-regulation.

In some cases the existence and persistence of multiple entities are not a realistic option. These contemporary disputes are united by a common thread. They involve situations in which one company controls a resource upon which other firms must rely to pursue their own businesses. The resource may be a transportation network, such as a railroad, or a telecommunications network, such as access to the Internet, upon which the firm must depend for distribution. Or it may be a platform, such as a computer operating system (Windows or Linux), for which an application writer provides a complement. Or it could be a distribution network, such as eBay, on which numerous small businesses have staked their futures, which has the characteristics of both. Or it could be a Google search engine that becomes the entry portal for millions of Web users.

The essential characteristics of networks and platforms drive these disputes. For example, the network or platform is commonly characterized by high fixed costs and low marginal costs. A railroad or telecom company is a quintessential example; each requires massive up-front investment in rights-of-way, construction, and equipment before a single customer is served. Thereafter, the extra ("marginal") costs of adding each additional customer are pretty trivial. This structure makes entry by competitors difficult, since they must duplicate the investment before starting business.

The network or platform can also be characterized by a need for interoperability. This creates strong pressures for the industry to coalesce around a single standard. Thus, the proprietor of the resource enjoys considerable market power. A dependent company cannot easily shift its reliance on the network or platform.

Each dependent fears that the network or platform, given its druthers, will raise the price of access to a level that extracts almost all the value from the total enterprise and leaves the dependent with only crumbs. They also know that the network and platform owners have a strong interest in turning the complements into cheap commodities. Doing so increases overall demand for its product and improves its leverage over the dependents.

Think of the position of software developers who write applications for Windows. Microsoft needs them because they add value to its product. But Microsoft also benefits if their returns are low so as to keep the total costs of the system low, thereby increasing its own sales.

In the worst case, the network/platform can wait until dependents commit resources, and then pounce. The classic example here is from history: the farmer who invests in land near a rail line and then sees freight rates zoom. The case of cheap long-haul rates, where there was competition among the railroads, versus high short-haul rates, where there was not, became one of the great raw sores of American politics during the Industrial Revolution.

But it is not enough to look only at the challenges faced by dependent enterprises. Each network/platform company also has a problem. It must spend substantial resources to attain its position. But it is wary of investing to the optimum because it fears that a political response organized by the dependent companies will result in confiscation once its capital is sunk.

Again an example from history is instructive here. In the 1870s, Illinois imposed maximum rates on grain elevators in Chicago. The excuse was that the elevator owners were over-charging and, perhaps, price-fixing, but the record is unclear. It may well have been simply that the customers preferred to pay less, had political clout with the legislature, and could take advantage of the fact that the elevator owners had committed their capital. One cannot pick up a grain elevator and move it to Indiana, so as long as the law allowed the owners to recover at least their operating costs, they were stuck.

The fears of both sides in this controversy are well founded. And, for reasons explored below, neither a "let the free market do it" nor a "let's regulate" solution provides a totally satisfactory resolution.

Unfortunately, our earlier efforts at achieving regulatory solutions did not end happily. To explore the problem in more depth, and to think about solutions, it is helpful to start with a simple but historically realistic model: a 19th-century railroad running past a factory or a farm. The railroad needs factories and farms en masse to provide revenue, but it does not need any single one of them. So, in the pre-truck days, the railroad could set a rate that captured most of the value of the combination of factory+railroad or farm+railroad. This allowed the producer factory or farm a return that paid only marginal costs, forcing it to forgo much if any return on capital.

Furthermore, the railroad could set different rates for every factory along its lines, extracting maximum value from each. A plant making a commodity product with low margins would pay a low rate; one making specialized goods with high demand would pay a high rate. But each could be charged so much as to be left with only the pittance needed to keep it in business.

Now, shift the hypothetical and add a second railroad. The factory's situation improves dramatically, because it can force the railroads to bid against each other. Indeed, if the factory is big enough, it can reverse the bargaining power, and use the railroad's own high-fixed, low-marginal-cost structure against it, driving rail rates down to the railroad's marginal cost, and forcing it to eat capital costs and retain only a pittance. If the shipper is big enough, such as John D. Rockefeller's Standard Oil, it can force the railroad to charge Standard's competitors a high price and then rebate part of the revenue to Standard, a twofer of disrupting the competitors and reducing the railroad's returns.

Some obvious ways exist for the participants to try to break out of these dilemmas, and they can work pretty well. A factory owner can build his factory where roads, rails, and water all coincide, taking his pick of transport modes, for example. Or he doesn't have to build a factory at all unless the railroad guarantees reasonable rates.

But these strategies work only approximately. Sometimes the location of production facilities is constrained by geography. And in many cases we are talking about serious long-term capital investments. If the factory is located first, how does it persuade the railroad to build? Does it promise never to use a different railroad? Not to use water transportation? Again, these are long-term investments under conditions of great uncertainty, and it is difficult to write the contracts that would be required. A significant problem with the mantra of "do it by contract" is that it requires contract writers with an unlimited legal budget and a level of foresight that would be the envy of a psychic.

Another possible solution to the problem is integration. If the railroad owns the factory, then allocating the total revenues it receives from the factory+railroad becomes a question of internal accounting. This approach, too, has precedents; it is a variation of the land grants given to railroads in the 19th century. These grants enabled them to finance construction by cashing in on the increase in the value of the land triggered by the building of the railroad, and by the ability to sell land to raise crops that the railroad could then haul.

But there are also some problems with integration. If the railroad owns one factory, then what about the competitors of that factory? The railroad has an incentive to charge them more or provide them

with inferior service. Google's chief legal officer, David Drummond, thinks that a modern example is Microsoft's attempted acquisition of Yahoo: "Could a combination of the two take advantage of a PC software monopoly to unfairly limit the ability of consumers to freely access competitors' email, IM, and Web-based services? Policymakers around the world need to ask these questions—and consumers deserve satisfying answers." (Actually, Microsoft does have pretty good answers, called its Interoperability Principles, which are discussed below.)

A great concern of the contemporary tech world is that innovators need access to platforms on reasonable and predictable terms if the full creativity of society is to be tapped. Besides, if society values innovation, a world of large integrated firms is a poor way to promote it. For many reasons, such as excess bureaucracy and fear of cannibalizing existing businesses, large entities tend to be stodgy. The railroads enabled the great catalog mail-order businesses that transformed rural America, but they did not invent them. A great concern of the contemporary tech world is that innovators need access to platforms on reasonable and predictable terms if the full creativity of society is to be tapped.

What about the opposite approach—forbid integration, and impose a legal rule against discrimination on price or other terms? This approach breaks down as a matter of elementary economics, which says that the capacity of a network/platform is not infinite, that it must be rationed and traffic prioritized, and that the price system is the best way to accomplish these ends.

Besides, the dependent companies themselves need price discrimination. If I own a factory, and another shipper can pay only a widow's mite for transportation, then I want the railroad to give that shipper a deal so that it contributes to the railroad's capital costs, even if it pays less than I do. If the railroad does not cut price far enough to capture this firm's business, then all the costs will fall on me. Of course, if the other factory is a competitor of mine, then my calculus changes; I want to share the costs, but not at the price of seeing a competitor get a cost break.

What about the competitive solution of ensuring that there are many railroads? This runs into the problem of setting prices in investment-heavy industries. Excess capacity develops, and then competition drives the price down to the marginal cost of the most efficient. Over time, this puts the others out of business and restores a monopoly situation, at which point prices are raised and the dependents are once again in trouble (until, at some point, some new technology saves them). While economists may look at this great wheel of life with equanimity, actual businesses and governments are less sanguine.

Besides, monopoly, rather than revived competition, may be the logical outcome. In some cases the existence and persistence of multiple entities are not a realistic option.

Historically, regulation was based on the concept of “natural monopoly,” which is an economic concept based on a high-fixed, low-marginal-cost structure that makes it inefficient to duplicate basic infrastructure. In a recent variation on theories of natural monopoly based on fixed costs, economists now discuss winner-take-all markets, which coalesce around a single technology, such as Windows on the desktop computer or Blu-Ray as the hi-def DVD disk because of the desire of users to interoperate. Economic theory says not to worry because new technologies will disrupt such empires in the long run; but dependent companies are not, unsurprisingly, interested in waiting for the long run, so there will be political pressure for countervailing action right now.

Say a good word about ‘common carrier law’ in front of a telecom or software executive, and they immediately reach for some holy water and garlic. The same basic scenarios between networks/platforms and dependents play out repeatedly, not just with shippers of physical goods but with developers of software applications for Windows, with Internet companies dependent on telecom firms, with search engines, and with cell phone manufacturers using patent-protected chips. Indeed, in the tech area, the whole “openness” philosophical movement—whether in the context of software or net neutrality or anti-copyright—traces at least part of its lineage to this 19th-century problem of shippers and railroads, and to the desire to avoid dependency. Old railroad battles over long-haul versus short-haul rates, oil tariff rebates, price discrimination, lines built solely for blackmail, and other issues of those thrilling days of yesteryear are re-enacted in the guise of Google battling Verizon and Comcast over net neutrality, or content creators battling Google over the division of search revenues, or the EU forcing Microsoft to open up server technology.

Inevitably, pressure develops for the political system to address the problems. Unfortunately, our earlier efforts at achieving regulatory solutions did not end happily. Many railroads went bankrupt in the late 19th century, and rural populists and investment bankers eventually cooperated to create a comprehensive regulatory regime under the Interstate Commerce Commission. Policy then oscillated between encouraging monopoly and exploiting the railroads for political gain. There were subsequent periods of flowering, but in the long term innovation withered and the railroads declined.

Telecommunications were also regulated and the history of the Federal Communications Commission became a sad saga of suppression of innovation and wasted spectrum. George Mason University law professor Thomas Hazlett, former chief economist at the FCC, has pointed out the technologies that

were substantially retarded by the agency's spectrum policies. These included FM broadcasting, which was delayed for 26 years. Many analysts have noted that the FCC's implementation of the 1996 Telecom Act attempted to turn telecom facilities into a giant commons, which depressed investment in new facilities in favor of investment in lawyers and economists who could game the rules.

Nor has the world beyond America's borders learned. If the EU continues to attack tech companies that achieve market power through innovation because it judges they are not being sufficiently sharing with competitors, the companies are not likely to prosper.

So how do we avoid repeating these experiences? A common complaint from academics, potential competitors, and complementary businesses is that regulatory regimes allow cartelization and monopoly by the networks/platforms. True enough, but, as the history of the railroads and telecommunications shows, the pressure to protect complementary dependent industries can also lead to reduced investment and innovation in the network/platform companies, to the detriment of all.

There is no rule of the world that says that all problems have neat solutions, and this is a set for which no theoretical answers emerge. But a number of practical approaches look useful.

First, it is important to understand what is not relevant. Antitrust law is fairly useless. It focuses on competition among the network/ platform companies themselves, and deals with their relations with dependent companies only in the limited context of "tying," when a dominant company sells a complementary product and forces the customer to buy it. Because antitrust doctrine focuses on harm to consumers—not to intermediate dependent producers—it becomes very difficult to see why tying should be of concern at all.

Say a good word about 'common carrier law' in front of a telecom or software executive, and they immediately reach for some holy water and garlic. To better understand this, consider that consumers do not care if they buy their copy paper from the same company that sells the machines. And if diners in New York have access to meat from Argentina and Poland as well as from Nebraska, antitrust should not, in theory, care if a railroad is extracting most of the value of the meat shipped from Nebraska. There is no consumer harm, because competition from overseas will keep prices down. But since the Nebraska farmers, other paper producers, and the U.S. political system all care a great deal about these situations, the antitrust system plays legal and economic Twister to argue that these are actually antitrust problems.

The EU has a doctrine called “abuse of a dominant position” under Section 82 of the EU Treaty which might, in theory, address the relationship between platform companies and producers of complements. Its language is broad enough to cover what is or is not permissible for dominant companies in dealing with providers of complements as well as with competitors.

However, the EU, under the tutelage of the U.S. Department of Justice, uses Section 82 to replicate—and lately, in the various contentious tech industry cases, to extend—American thinking about actions by dominant companies designed to protect their existing market power, as opposed to how they use this power. It does not look at the actions of such companies in dealing with providers of complements, unless by some intellectual gymnastics a provider can be characterized as a potential competitor of the dominant firm.

If antitrust thinking is of little help, it might seem logical to turn to common carrier regulation, the elaborate regimes developed by the Interstate Commerce Commission, the FCC, and many other federal and state regulatory bodies to control railroads, telecommunications, utilities, and other network industries. This, too, is dangerous, because over the decades these bodies of rules became detailed and intrusive, and constantly distorted by political influence and regulatory whim. Say a good word about “common carrier law” in front of a telecom or software executive, and they immediately reach for some holy water and garlic.

On the other hand, the concept of “common carrier” actually developed earlier, under common law, long before the Industrial Revolution. And some of the fundamental and limited common carrier principles invented in this pre-regulatory era are quite interesting—they consisted of openness, availability, advance notice of terms, and inhibitions (but not prohibitions) on price discrimination.

Reading 19th-century law cases is not usually considered good preparation for analyzing issues of the Internet Age, but in fact it is a useful mental exercise. If one is forced to think with the Supreme Court in *Munn v. Illinois* (1877), which judged state power to impose price caps and other regulation on grain elevators, it is clear that many of today’s issues were raised over a century ago. For a preview of the current debate over net neutrality, examine the Court’s 1892 discussion of whether “party rates” for groups such as theatrical troupes violated a prohibition on price discrimination. The answer was “no,” with the reservation that the decision might change if the railroad differentiated among competing producers.

The 'openness' philosophical movement traces part of its lineage to the 19th-century problem of shippers and railroads, and to the desire to avoid dependency. These questions are more complex than laissez-faire advocates would have you believe, and there is some wisdom in those old cases and their rules. A dependent company's biggest problems are ambush, in which its resources are committed and then the network/platform company raises the rates; uncertainty, as when an innovator is in the impossible position of asking a large carrier, "If we invented an X, what would you charge to attach it?"; negotiation costs of trying to get an answer from a large network company's bureaucracy; and price discrimination, in which a competitor gets lower costs. Advance notice, transparency, and guarantees that no other customer will get a better deal from the network/platform company (so-called "most-favored-nation clauses") are powerful tools.

It is equally important to recognize the limitations of common carrier-like approaches. "No integration" may seem attractive, but it deprives consumers of the advantages of efficient packages. In general, integration often has some powerful benefits, especially in allowing consumers to buy packages of integrated products and services. No one wants to buy an automobile one part at a time, and the same is true increasingly of computer programs. We want plug and play. Should Apple be required to unbundle its hardware/operating system/applications package? It is precisely the smooth integration that makes the Mac appealing to so many.

Also, over time, a no-integration rule that a network or platform must be nothing but a stand-alone dumb pipe triggers a cascade of problems that must lead to regulation, price control, and technological stasis. Imagine a telecom future in which every household has ready access to cable, fiber-optic lines, broadband over power lines, and satellite. Assume that the basic infrastructure has been put in place and the only gap is connection to the premises. Now, suppose that each of these is a dumb pipe, forced to carry all content. The obvious result would be a war that drove prices down to marginal cost, which would starve the carriers of the ability to service their capital or maintain their plant, and send them into bankruptcy. Perhaps the only way to maintain competition among carriers in the long term, and thus avoid the evils of regulatory structures, is to allow integration.

It is not easy to find an optimum path between the limited doctrines of historic common law common carrier doctrines and full-blown regulatory regimes. However, network/platform companies can influence their own fate by contractual obligations or public announcements, especially if these constitute binding obligations, either practically or legally.

It took the great and only partly successful deregulatory effort that started in the 1970s to unchain the economy from the problems caused by the solutions of an earlier era. In 2005, the FCC did the telecom

companies a favor by issuing four principles supporting openness on the Internet. The principles said consumers are entitled to access the lawful Internet content of their choice, to run applications and use services of their choice, to connect their choice of legal devices that do not harm the network, and to have competition among network providers, application and service providers, and content providers. In sum, Internet service providers (ISPs) will not be allowed to exploit their position to exclude others' content or devices.

The FCC had no particular authority to adopt these principles, and their legal status remains uncertain. They are important though because the fear of dominance by ISPs is great, and telecom companies might well forestall unpleasant regulation by promising not to assert their maximum position. In fact, no telecom company dares contradict the four principles, and a large part of their response to demands for net neutrality rests on the proposition that the four principles make any such regulations unnecessary.

On this issue, the telecoms' strategic willingness to give up part of what might be their formal rights under existing law is very wise. The action recognizes that something is needed that lies between the old regulatory models and total telecom discretion, and that there is no reason for the telecoms to wait for it to be imposed legislatively. They have little to lose, because any effort to claim a right of total control over Internet traffic carries heavy risk of a reaction that deprives the carriers of all discretion.

Another example of a company's strategic wisdom in ceding formal legal rights is Microsoft's 2006 adoption of its Windows Principles, designed to assure applications developers of their ability to capture the financial benefits of inventiveness. Microsoft acted under the lash of the Justice Department, admittedly, but the result is important. For one thing, it makes clear that the real axis of the antitrust case against Microsoft revolved around its relations with complements, not with the bogus issue of creating competitors to the Windows operating system. Microsoft extended this philosophy recently with its Interoperability Principles, which, while they must have been long in the works, might have the happy effect of blunting Google's arguments about the Yahoo deal.

The development of the open-source Linux operating system serves the same function as Microsoft's Principles—that of assuring developers of complements that they cannot be exploited after they have committed their resources. Tech expert George Gilder once attributed the rise of the open-source software movement to the fact that in the late 1990s Microsoft's share of the total value of Windows+application systems sharply increased, thus irking the developers, who became receptive to the idea of a new platform.

Other examples of private efforts to solve the network/platform problem can be found, especially in the tech industry, where the concept of granting licenses based on “reasonable and nondiscriminatory” (RAND) terms has taken hold. In the search for solutions, it is better to look at these new contractual models than at the old regulatory structures.

The telecoms’ willingness to give up part of what might be their formal rights under existing law is very wise. But a sense of history is also important, because, as philosopher George Santayana said, “Those who cannot learn from history are doomed to repeat it.” Historian Crane Brinton added that, unfortunately, those who can learn from history are doomed to repeat it with them. The great regulatory regimes of the 19th and 20th centuries were established because of real and difficult problems centered around the nature of high-fixed, low-marginal-cost network/platform providers and their relationships with the producers of complements that depend on these providers.

These regulatory regimes failed in many ways, and the great deregulation movement was immensely important. But the people who put the regimes in place were not stupid. We should look at their regulatory solutions as a natural experiment that did not quite work, and develop a new synthesis that incorporates the merits of both laissez-faire thesis and regulatory antithesis.

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