An Interview with Richard John

The Politics of Network Evolution

by Gil Press

Editor's Introduction

Richard John is a professor at the Graduate School of Journalism, Columbia University, and a historian of communications networks in the United States. His most recent book, Network Nation, *won the inaugural Ralph Gomory prize from the Business History Conference and the AEJMC prize for the best book in the history of journalism and mass communications.*

Network Nation *turns the tables on several generations of historians, social theorists, and cultural critics who have been downplaying the influence of governmental institutions and civic ideals on major technological innovations. Supported by meticulous historical research, John demonstrates that from the 18th century to the present, technology and politics have been inextricably linked. Nothing was inevitable in how the telegraph and telephone networks and the businesses built around them have evolved in the United States and this evolution has been shaped by the prevailing—and changing—public attitudes and government actions.*

The influence of politics, John contends, is evident in the business decisions made by the executives running the telegraph and telephone companies and in how they developed and pursued their business strategies. To argue that these technological inventions led in some predetermined way to the establishment of a particular organizational structure or business strategy is to "obscure the historical process by imputing agency to electrical equipment, batteries, and wire."

The following is an edited transcript of my conversation with Professor John in March 2011.

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Ubiquity: What do you mean by "imputing agency" to technology and how does it color our understanding of the past and present of the relationships between technology and society?

Richard John: We live in an age in which it's very easy to assume that big changes occur as a result of technological innovation. We talk about the "Facebook or Twitter revolution" or the "Googlization of news and information." In my view, this is more than just a fall-back position to explain a complicated phenomenon. It's a pernicious habit by which we forget that machines, technical contrivances, even vast networks, not only have a history but have a particular logic that's set in motion by a constellation of governmental institutions and civic ideals. They don't exist outside of politics. I think it's easy for promoters, publicists, advertisers, to talk about economic incentives and technological imperatives that tell stories about the past that are intuitively plausible. But one of the main conclusions of my book is that these stories are simply wrong. They do not explain how the telegraph and telephone networks evolved—their geographical penetration, who they were meant to serve, how they were configured—an evolution that had less to do with their intrinsic technological attributes than it did with the wider world in which they emerged.

Ubiquity: Give me an example.

John: The optical telegraph, a remarkable network using the line of sight to move information from one station to the next, could have been devised by the Romans or medieval princes, but instead was developed in France to meet a specific need: The military challenge of keeping France together in a revolutionary world. The idea was around, but the French state made it into reality. And almost exactly in the same year, 1792, the United States Congress transformed our long-distance communications network—the mail—by giving control of the extension of the network to Congress, rather than the executive branch, and by insisting that information on public affairs, which primarily took the form of newspapers, be privileged. Although these two developments were the result of the same revolutionary, republican ideals, they played out differently in France and in the United States. In France, the optical telegraph was a monopoly of the state from which ordinary people—including merchants—were excluded. In the United States that would have been inconceivable; ordinary people had access to the network from

the beginning and merchants were supposed to underwrite its cost. So you have two networks, established around the same time, both part of a civic republican project, but very different in their character and mandate.

What's so remarkable about the subsequent history of electrical communications networks, is that this civic ideal—access to information—shaped the development of both the electric telegraph and the telephone but in very different ways. In the case of the telegraph, access from the 1840s until the 1900s referred primarily to the provisioning of service by network providers; in the case of the telephone, in contrast, it came by around 1900 to refer primarily to the facilities available to network users. In both cases, the presumption that everybody should have access to the network is a cultural ideal and has nothing to do with any particular technical attributes—battery, electricity, what have you.

Ubiquity: You take this further and argue that society's values influenced business strategy.

John: That's right. My mentor, Alfred Chandler, the great business historian, once published a book called *Strategy and Structure*, on how business strategy shaped organizational structure. One of the central themes of *Network Nation* is the influence of political structure on business strategy. The telegraph and the telephone developed very differently because of the political environment in which they were located. In the case of the telegraph, the rules of the game by the mid-1850s favored the establishment of a large number of network providers that competed with each other in a political environment that I call anti-monopoly—a political economy in which lawmakers adjusted the rules of the game to insure that no single telegraph company could acquire too much power by virtue of its patent rights.

The cultural history of the telegraph and the telephone revolves around a remarkable irony: The electric telegraph, from the beginning, was promoted as an epochal technical advance that was going to transform the world. All this hype might lead you to suppose that the managers of the telegraph companies would say, "We have a great technology, let's develop it in an expansive way."But in fact, they did precisely the opposite. Telegraph managers long rejected the common assumption that the new medium would ever become a mass service for the entire population; instead, they remained content to provide a specialty service for an exclusive clientele. The telegraph, in fact, would not be configured as a mass medium until 1910—65 years after its initial commercialization, and about a decade after local telephone service had been popularized in the nation's largest cities. In large part, that was because telegraph managers were operating in a political environment that encouraged competition. Competition obliged them to stay focused on the here and now: They recognized that if they did not meet

the short-term economic needs of their investors, they might be out of business. Unlike telephone managers—who operated in a very different political environment—telegraph managers did not have the luxury of being able to use cross-subsidies to popularize the medium and make it available to the masses. As late as 1880, the president of Western Union told anyone who would listen that he had no intention of providing facilities for ordinary Americans to use the telegraph. If ordinary people wanted to send a message at high speed over long distances, they could mail a letter. Here you have a technology that is regarded as one of the greatest achievements of the age, yet the business strategy of its promoters is extremely narrow. Network providers limited access to the telegraph to an exclusive clientele, and understood the civic ideal of equal access to the fruits of invention to refer less to the users of the new medium than to its promoters.

The case of the telephone was exactly the opposite. With a few notable exceptions, the initial commercialization of the new medium elicited little public comment. In large part, this was because it developed as a city-based medium that supplemented already-existing facilities—such as telegraphic messenger services. But the political environment was very different, and network managers quickly learned that, if they were to succeed, they would have to develop a more expansive business strategy. Here too politics was key. In order to establish an operating company, telephone managers needed to get permission from the city government. This permission typically took the form of a municipal franchise. Municipal franchises were typically very specific—for example, they often specified rate caps—and they almost always limited entry into the market. In practice, this meant that there were almost never more than two telephone companies operating in a single city. In the case of the telegraph, in contrast, competition was far more common—a byproduct of the many state antimonopoly laws modeled on the New York Telegraph Act of 1848. The importance of municipal franchises for telephone operating companies helps explain why, in the 1890s—and often against their better judgment—several telephone managers popularized the medium by providing access to the telephone to a high percentage of the population of the city.

Ubiquity: Why were the managers running telephone companies opposed to expanding the network? Didn't they know that the value of the network increases with its size?

John: The idea that the network effect exists in all communications media and there is always a reason to expand the size of the network would have seemed strange if not bizarre to most telephone managers in the early years of the business—that is, in the period between the late 1870s and 1900. The reason was simple. The cost of providing telephone service increased as the number of nodes increased because it was necessary for operating company managers to

rely on human operators to switch every single telephone call. Though dial-up telephones were successfully commercialized beginning in the 1890s, they were mostly confined to smaller exchanges—and with a few minor exceptions were not used at all by the dominant network provider—which was known popularly as Bell, the ancestor of both Verizon and AT&T. Existing users also had misgivings about network expansion. In part this was because they had no interest in communicating with a large number of people either inside the city or throughout a region; in addition, they feared, not implausibly, that a bigger network would lower the quality of service that they had come to take for granted. There were, in short, plenty of reasons not to expand the telephone network. Even so, because of the political environment, incentives existed for managers to expand its size. Telephone company managers in the 1880s and 1890s had a big problem that they reasoned network expansion might help them to solve. They found it very hard to convince city councils to let them increase rates, which they had to do because these same city councils had required them to make major capital investments to put their overhead wires underground. The city councils reasoned that this was not a service improvement—and thus could not justify a rate hike. If, however, telephone managers contended that they had spent the money to make it possible to telephone over long distances, the city councils were more likely to go along. By hyping up long distance, they solved a major political problem. In doing so, they tilted the public debate over telephone access from the rights of network providers to the utility of network users and from the vilification of privilege to the disparagement of waste caused by competition.

Ubiquity: Does the role of users change as the network grows?

John: Yes, but in sometimes unexpected ways. In the case of the telegraph and in the early days of the telephone, users were quick to lobby for cheaper rates. It was easy for them to do so because they knew each other—and the rate structure was relatively straightforward. If there was only a single rate, it was easy for users to band together to protest that it was too high. The same was true early on in the case of the telephone. But as the telephone network became larger and more variegated, and, in particular, as it shifted from a specialty service for an exclusive clientele to a mass service for the entire population, users found it harder to organize. In addition, and at the same time, big-city users became wary of competition—partly because they favored the interconnection of rival network providers (which competition typically foreclosed), and partly because they feared, with some justice, that competition might well lead to rate hikes. As a consequence, so long as operating company managers provided a menu of calling plans that appealed to different segments of the population, users often became the incumbents' greatest political ally—especially in battling potential new entrants. Users had little trouble with monopoly if they believed that the existing network served them well. As networks

become bigger, it can be harder to change their policies than when they are smaller. This is a dimension of network externality that has little to do with the value of the network to the user but much with its value to the provider.

Ubiquity: You discuss in the book how the value to the service provider, the idea that cost goes down as the network expands, was promoted by the new social scientists at the beginning of the 20th century as "natural monopoly," a new economic theory.

John: Natural monopoly theory was popularized because of very specific historical developments. Jay Gould's takeover of Western Union in 1881 was one of the many unanticipated consequences of the antimonopoly tilt in American law. Ironically, a self-proclaimed anti-monopolist now presided over a corporation that controlled 90 percent of the telegraph market in the US. To explain this puzzling, unexpected, and widely deplored development, a rising generation of social scientists popularized a new economic theory. This theory repudiated antimonopoly as a civic ideal by characterizing large and powerful corporations like Western Union as "natural monopolies."

The term natural monopoly was coined by John Stuart Mill in 1848 to describe an individual with a unique talent, providing that individual a competitive advantage. Richard T. Ely [the founder of the America Economic Association] borrowed the term to characterize Western Union in 1888. Implicit in Ely's definition was the then-novel presumption that the market power of corporations like Western Union owed more to technological imperatives and economic incentives than to government-granted special privilege. Ironically, Ely floated this new definition not to liberate Western Union from political scrutiny, but to bring it under more effective federal government control.

The popularization of natural monopoly theory was part of a deliberate campaign by the first generation of academically trained social scientists to marginalize investor-managers like Gould. Ely's primary concern was not unit costs but financial speculation. This dimension of the subject, it seems to me, is often neglected both in historical accounts of network building and also in present-day thinking about communications networks. The importance, in Ely's mind, of having only one telegraph or telephone network was not only or even primarily economic and technological. In addition, and even more importantly, monopoly would prevent would-be telegraph or telephone local companies from gaming the system in order to lure unwary investors and increase the capitalization of the existing infrastructure which in turn obliged the network providers to raise prices because they were carrying a heavy load of debt. The theory of natural monopoly provided a solution to this financial problem because if you posited that

competition was undesirable, then the opportunity for insurgents to try to upset existing institutional arrangements will be foreclosed. The dilemma posed by antimonopolists-turned-monopolists like Gould presented itself to business leaders in the 1880s with a vividness that business leaders understood intuitively and that social scientists transformed into an ostensibly neutral social theory.

Ubiquity: In the early part of the 20th century, we see the emergence of the regulatory policy of market segmentation, to counter the power of the "natural monopoly" of Bell, the dominant telephone company.

John: The Bell System flourished in a political environment in which lawmakers regarded market segmentation as a solution to the problem that monopoly posed. This political economy was not antimonopoly but progressive—that is, it fostered network providers who, like Bell, combined technical virtuosity with financial orthodoxy. Monopoly per se was no longer the problem—provided that lawmakers had in the form of a regulatory commission a mechanism to keep it in check. Politics had artifacts: What Europeans called "cartels," Americans called "industries." And in telecommunications, the boundaries dividing industries were politically defined.

Of all the market-segmenting arrangements to be codified in the period between 1907 and 1996, few had more far-reaching consequences than the segmentation between network providers and content providers of radio and television. For millions of Americans for much of the 20th century, the programming on radio and television networks transmitted over Bell's long-distance network defined what it meant to live in a networked nation.

The Bell breakup was a notable example of the post-1970 revival of antimonopoly as a remedy for the social, political, and economic challenges posed by large corporations, especially those benefiting from the theory of natural monopoly. Although the Bell System had kept local telephone rates low, it had never provided the low-cost, long-distance telephone service that post-1970 users came to demand.

Ubiquity: Which brings us to today's network neutrality debate.

John: From a historical perspective, the network neutrality debate can be understood as an attempt to institutionalize certain principles of market segmentation by requiring network providers to permit Internet applications to use their facilities more or less impartially. This is an old aspiration, and one for which there is ample warrant in the historical record. The history

of American telecommunications shows a recurrent pattern. The federal government did not control the content of information sent via the post office, the post office did not get control of the telegraph, the telegraph did not get control of the telephone, the telephone did not get control of radio. That outcome was in every instance, a product of political contestation—it was not simply a result of technical necessity or economic logic.

Lawmakers may decide to prevent network providers from blocking content, or decide to prevent them from charging more for bandwidth hogs. Here, too, one can look to history for a possible analogy. The popularization of telephone service in major U. S. cities beginning around 1900 was hastened by the abandonment of flat-rate calling plans for local service. Flat rate service permitted users to make an unlimited number of calls in a local area—in this sense, it can be regarded as roughly analogous to some of the more extreme network neutrality proposals that are being floated today. Flat-rate service was a huge problem for telephone operating company managers—and, had lawmakers not permitted network providers to abandon it, the popularization of telephone service would have taken much longer. The genuine problems that flat-rate calling plans posed for early 20th century telephone operating companies have often been neglected by specialists in telephone history. They assume—mistakenly—that American consumers had a supposedly innate preference for unlimited local service and that telephone companies had an obligation to provide it. From the perspective of these specialists, the switchover in big cities that began around 1900 from flat rates to measured service was a disaster for the small user.

This is simply not true. In fact, the opposite is closer to the truth. The introduction of pay-as-you go schemes for local telephone service hugely expanded access to the telephone for small users—and were wildly popular in several U. S. cities in the 1900s. In Chicago, for example, tens of thousands of telephone users took it for granted for many decades that, if they wanted to make a telephone call—even from their own home—they would put a nickel in the slot. The "nickel-in-the-slots" were a solution to the early 20th century equivalent of the bandwidth hogs of the present day. True, service was often slower, but users didn't care. Business users were almost always very sensitive to the on-line wait time for a telephone operator; residential users typically were not. In many instances, in fact, residential users voted with their feet for low-cost telephone service, even if this service was of lower quality—in the sense that it took more time to get access to an operator to make the connection—than business users demanded. The bandwidth hogs in 1900 were business users who took advantage of flat-rate calling plans to make hundreds of calls—clogging the network. Advocates of net neutrality would do well to recall that—in the absence of pricing mechanisms that differentiate between big and small users—it may be impossible for network providers to expand access to the extent that is in keeping with American civic ideals.

Bandwidth hogs are bandwidth hogs and the problems they pose Internet service providers today are no less real than they posed for telephone network providers in 1900. It is one thing for lawmakers to mandate open access—in the sense of preventing network providers from blocking access to certain kinds of content entirely; it is quite another to prevent network providers from devising sensible pricing schemes that would enable them to better manage their networks. The telephone would have been popularized much more slowly in large U. S. cities had city councils blocked telephone operating company managers from experimenting with measured service. The same problems might well recur today if lawmakers define the principle of network neutrality in an overly rigid way.

One additional point about network neutrality is perhaps worth emphasizing. Innovation in American communications has sometimes been generated by companies—like Bell—that found it possible to vertically integrate, for example, by maintaining research-and-development laboratories and manufacturing facilities. I wonder if this might remain true today. It is entirely possible that if network neutrality is defined to preclude every possible kind of upstream and downstream experimentation, fruitful experiments that could promote the public good might be forestalled.

Certain kinds of content have almost always been subsidized in one way or another. This has almost always been true, for example, of the provisioning of high-quality news reporting. The ubiquity of various kinds of subventions in news reporting in the past has prompted several of my colleagues at the Columbia Journalism School to try to figure out how one might devise analogous cross-subsidies today. Here is one instance in which it would seem to be obvious that network neutrality might prove counterproductive: If, for example, it discouraged high-quality news reporting, this would obviously be a problem that lawmakers would want to address. Having said this, however, I should underscore that, in general, the longstanding presumption that communications markets should be kept distinct has served the country well. In Britain, Germany, and Japan, you had a lot of cross-subsidies that turned to be not advantageous. If we are wary of concentrated power, then the historical record provides us with good reason to encourage, or even mandate through legislation or judicial decisions or some other administrative mechanism, certain divisions between network providers and content providers—and even between different network providers. The telephone would have been less innovative had it been dominated by the telegraph and I don´t think we would have been well served had AT&T dominated radio in the 1920s—as it almost certainly could have in the absence of political constraint.

As I look at the political landscape today, it would seem to me that the idea that communications networks have a civic mandate that is enforceable and that obliges them to be accountable to somebody other than their investors, is not in the ascendancy. The related idea,

that network managers have a social obligation, is often challenged or even ridiculed. If this characterization is on the mark, then it seems to me that the time-honored remedy for the abiding challenge that is posed by economic consolidation is for lawmakers to mobilize in order to foster competition that can encourage not only innovation but also the kind of uncertainty that can limit the potential for market abuse. Antimonopoly is a venerable civic ideal that, in sometimes perverse and sometimes creative ways, has helped make American telecommunications distinctive and it may be time to remember why it has long been a defining feature of communications policy in the United States.

About the Author

Gil Press has worked as a research and marketing executive at NORC, Digital Equipment Corporation, and EMC Corporation. He is Managing Partner of gPress, a social sciences and market research consultancy.

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