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Tech Dominance and the Policeman at the Elbow

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INTRODUCTION

What drives the "digital tornado," to use the evocative phrase coined by Kevin Werbach to describe the fierce, concentrated winds of technological change? One school of thought, neo-libertarian at its core, sees it as an entirely private process, driven by brave scientists, risk-taking entrepreneurs, and the capital markets. If government is relevant, it is merely through the guarantee of property rights and contract; otherwise it does best by staying out of the way.

But what if powerful firms seek to slow down, modulate, or co-opt the winds of change? The view just described takes this as an inherently hopeless task, for it is axiomatic that the rate of technological change is always accelerating, so that any firm or institution dependent on a given technology is therefore automatically doomed to a rapid obsolescence. Even well-meaning laws designed to catalyze innovation, at best, merely risk interfering with a natural progression toward a better technological future, hindering "the march of civilization." As the general counsel of Standard Oil once put it, government cannot control the aggregation of private power: "You might as well endeavor to stay the formation of the clouds, the falling of the rains, or the flowing of the streams."[1]

This view, which was widely held in the early 2000s through the 2010s, has great relevance for the antitrust law, the subject of this chapter, and particularly, the parts of the law concerned with monopolization. For if we can indeed assume that the rate of technological innovation is always accelerating, it follows that there can be no such thing as lasting market power, the concern of the law. The dominant firm, necessarily dependent on an older technology, will be quickly surpassed and replaced by a new firm. In its strongest version, it suggests that the antimonopoly portions of the antitrust law are obsolete.

[*] This essay benefited from comments by Kevin Werbach, discussions with Randy Picker, and an illuminating conversation with Bill Gates.

[1] Quoted in Tim Wu, *The Curse of Bigness* (2018).

Over the 1980s through 2010s, a series of powerful anecdotes supported this narrative, so much so that it became a broadly accepted wisdom. After all, IBM, in the 1970s and 1980s, once thought lord of everything, was bested by a college dropout named Bill Gates and a few of his buddies. Microsoft, in turn, was ravaged by a series of garage startups with goofy names like Yahoo!, Google, and Facebook. AOL rose and then fell like a rocket that fails to achieve orbit, as did other firms, such as MySpace, Netscape, and so on. The chaos and rapid change made it obvious to many that there could be no such thing as a lasting monopoly. A three-year old firm was middle-aged already; a five-year old firm almost certainly near death, for "barriers to entry" were a twentieth-century concept. The best, indeed the only thing the antitrust law should do is to stand well back and watch.

But what if the supposed new order itself were itself just a phase? What if the assumption of constant accelerating technological change is wrong – or a function of market structure? As these questions may suggest, this chapter joins the challenge to the narrative described. I say join because it is a larger conversation, not to be settled with one single chapter. The contribution of this chapter is to examine a foundational part of the narrative – the erosion of IBM's dominance in the 1970s and the case of *United States* v. *IBM*.

Why focus on IBM? The decline of IBM's dominance over the 1980s has long been a foundational part of the story that we described in the introduction, one that casts the "new economy" as an exception to the usual rules of industrial organization. As the story goes, IBM, bested by Microsoft, Compaq, Dell, Intel, and other competitors, serves as strong proof that lasting monopoly in unachievable in high-tech industries. Even the mighty IBM could not hold out, given the inevitable challenge from new inventions and innovators.

Unfortunately, that account tends to overlook the fact that IBM was not subject only to the forces of technological change, but also faced significant legal challenges, targeted directly at the exercise of monopoly power. This chapter suggests, with the benefit of decades of hindsight, that subjecting IBM to an antitrust lawsuit and trial actually catalyzed numerous transformational developments key to the growth and innovation in the computing industries. The undeniable fact is that the "policeman at the elbow" can and does change conduct. The IBM case put a policeman at the elbow of the world's dominant computer firm during a crucial period of change and development in the technology industries. This, I suggest, aided an ongoing process of transformational or Schumpeterian innovation.[2] Contrary to conventional wisdom, I also think that *United States* v. *IBM* is a valuable guide to enforcement policy in the technology-centered industries. This chapter, in short, is a revisionist history of the *IBM* case, one that casts serious doubt on the narrative of law's irrelevance in aiding technological change.

[2] I elaborate this theory in Tim Wu, *The Master Switch* (2010), at pp. 138, 158.

The goal is not just to give the *IBM* case its due among those who study law and technology, but also to rehabilitate its reputation within antitrust law, where, it is given, conventional wisdom has not been kind. *United States* v. *IBM* has been cast as among antitrust's lowest moments, and among the Justice Department's greatest mistakes. Robert Bork memorably dubbed the litigation "Antitrust's Vietnam"; Joseph Lopatka termed it a "monument to arrogance"; while an appellate judge quipped that it "went on longer than World War II and probably cost as much."[3] Lasting from 1969 through 1982, the case included a six-year trial; the government's presentation took 104,000 pages of transcript, while for its part, IBM called 856 witnesses and cited 12,280 exhibits. Yet after years of trial, the Justice Department withdrew the case in 1982, without settlement or judicial remedy. The failure of the case to reach a verdict added ammunition to a Reagan-era movement against antitrust's "big case" tradition.[4] This has yielded, for many, one lasting "lesson" from *IBM:* that "big antitrust" – the industry-clearing Section 2 cases – should be used sparingly, at best, given the costs and potential for failure.

This chapter challenges the conventional wisdom and suggests that the IBM lawsuit and trial, despite never reaching a verdict, actually catalyzed numerous transformational developments key to the growth and innovation of the computing industries.

I do not seek to defend everything about the IBM trial. It is admittedly difficult, if not impossible, to defend the manner in which the Justice Department and court managed the litigation and allowed it to last so long. It is also true, as the critics have charged, that the government could have had a clearer theory from the outset. However, in spite of the lack of a remedy, the historic materials made available since the litigation have made it clear that the antitrust case did substantially change IBM's behavior in specific ways. Perhaps the most important was the case's role in pushing IBM to unbundle its software offerings from its hardware, and therefore to leave room for the birth of an independent software industry. While the effects are less direct, the case seems to have also influenced the manner of IBM's PC launch and its conduct thereafter. These developments appear to have at least contributed to the thriving of an independent computer software industry, and later, to a new market for competing, IBM-compatible personal computers, as well as a slew of related, independent industries in storage, processing, printing, modems, and otherwise. During this period, IBM's avoidance of exclusive contracts and its failure to acquire or seek control of obvious targets (like Microsoft itself) all suggest a firm with "antitrust phobia," and thereby one that allowed competition to flourish.

Of course, there were a great number of other factors in the late 1970s affecting the software and hardware industries, and there is no claim here that the IBM antitrust

[3] Steven Brill, What to Tell Your Friends About IBM, *American Lawyer* (April 1982), 1.

[4] *See* Gary L. Reback, *Free the Market!: Why Only Government Can Keep the Marketplace Competitive* (2009); William E. Kovacic, *Failed Expectations: The Troubled Past and Uncertain Future of the Sherman Act as a Tool for Deconcentration*, 74 *Iowa L. Rev.* 1105 (1989).

litigation drove everything that happened during this era. However, many of the existing narratives are too quick to assume that the developments were "inevitable," or, alternatively, all the byproduct of the particular genius of Bill Gates, a favorite thesis of the Microsoft-centered books. As discussed earlier, it is well understood by legal scholars that both firms and individuals may behave differently when enforcement is more likely, especially "with a policeman at the elbow."[5] The operating theory of this chapter is that a pending monopolization case, which focuses on exclusionary and anticompetitive acts and scrutinizes efforts to dominate new industries, may affect firm conduct in recognizable ways. And the thesis is that the policeman standing at the elbow of the dominant computing firms during the 1970s and early 1980s had an important impact on the development of the software and personal computing industries.

This reexamination of *IBM* also has important implications for antitrust enforcement policy, for an enforcer interested in "big cases" in the tech industries filed under Section 2 of the Sherman Act. To say that antitrust has, in the late 2010s, regained relevance is to state the obvious. For since the turn of the millennium, when it seemed that market power was indeed always going to be fleeting, the tech industries have consolidated into a much smaller number of "big tech" firms. The question, therefore, of when to bring a big tech case and against whom has returned to first-order importance.

This chapter suggests three things. First, that government lawyers should look for situations where it appears that a single firm is sitting as gatekeeper on what might, plausibly, be several innovative industries, and where breakups or lesser remedies might therefore unleash substantial growth. Specifically, beyond the usual search for monopoly power and anticompetitive practices, enforcers should be looking for "bundled" or "tied" markets that have the potential to be those nascent industries. The presence of stunted cottage industries might suggest an underlying potential. Second, the IBM case suggests the importance of a credible threat – that is, an investigation that seeks dissolution or other important remedies – so as to induce actual changes in conduct and deter anticompetitive behavior. Finally, the IBM case cautions enforcers to be concerned, but not overly concerned with the costs of investigation and trial, which are multimillion dollars questions, when there are billions and possibly trillions at stake.

BACKGROUND: THE COMPANY AND THE MARKET

The predecessor firm to International Business Machines was founded in 1911, as a manufacturer of machines for tabulating and data processing. By the 1960s, IBM

[5] For a recent account of the influence of a high probability of law enforcement over compliance with the law, *see* Aaron Chalfin and Justin McCrary, *Criminal Deterrence: A Review of the Literature*, 55 *J. Econ. Lit* 5 (2017) (reviewing effects of increased law enforcement on crime); *see also* Robert C. Ellickson, *Order Without Law: How Neighbors Settle Disputes*, pp. 147–148 (1991) (dismissing extreme view of "legal peripheralism").

had become a dominant manufacturer of general purpose, or "mainframe" computers designed to be used by corporations, government agencies, and other large institutions. "Big Blue" was, by then, the largest computer manufacturer in the world. By 1971, IBM had grown to 258,662 employees and $7.2 billion in annual revenues, and its IBM System/360 was the nation's, indeed the world's, most successful computer line.[6] It was a proud company, and its anthem went as follows:

> EVER ONWARD – EVER ONWARD!
> That's the spirit that has brought us fame!
> We're big, but bigger we will be
> We can't fail for all can see
> That to serve humanity has been our aim!

During the 1960s, the "mainframe" was the dominant computer design – one large computer, covered with blinking lights, designed to handle the most challenging tasks, or to serve many users at once. There was no such thing as a personal computer: At that point the cheapest computers sold by IBM cost over $100,000, and the more expensive units were priced in the millions.

IBM's design philosophy was characteristic of the era of its greatest success – it embodied the system design thinking of the 1950s and 1960s, which favored centralized, fully integrated designs, of which AT&T "Bell System" was the exemplar.[7] Hence, IBM's mainframe computers integrated, or bundled, all hardware, software and peripherals in one package. Of particular interest to us, software was not made available for sale or lease as an independent product: It was a service provided to buyers of IBM hardware.

IBM was not without competitors. The mainframe market was lucrative, and by the mid-1960s, IBM faced competition from seven smaller firms (the "seven dwarfs"), with their own mainframes, such as Burroughs, Univac, NCR, CDC, GE, RCA, and Honeywell. Firms like Univac typically targeted the lower end of the mainframe market, and attempted to win consumers with lower prices. In the early parts of mainframe history, all of the computers offered for sale were incompatible: That is, a firm usually bought all of its computers and peripheries from either IBM or Univac, for the computers were incapable of working together. Later, some firms began to offer peripheral hardware, like disk drives, designed to be "plug-compatible" with IBM's System/360 mainframes, which meant one could plug the peripherals into IBM's machines. Finally, other firms, like Control Data, focused on superior performance, and in particular, the supercomputer market, crafting computers faster (and even more expensive) than IBM's offerings.

[6] Daniela Hernandez, Tech Time Warp of the Week: 50 Years Ago, IBM Unleashed the Room-Sized iPhone, *Wired* (June 27, 2014), https://www.wired.com/2014/06/tech-time-warp-ibm-system360/.

[7] The centralized design ideology is described in Wu, supra note 2, at pp. 45–60.

THE CASE

Over the 1960s, there were long-standing complaints that IBM was maintaining its mainframe monopoly and scaring people away from supercomputers using anticompetitive, predatory, and unethical practices. IBM and its management had faced antitrust complaints before: Tom Watson Sr., IBM's longtime CEO, was convicted of criminal violations of antitrust back in 1913 (when he worked for NCR), and actually sentenced to prison.[8] What's more, in 1956, IBM entered into a consent decree with the Justice Department surrounding its leasing practices.[9]

Matters came to a head when, in 1968, rival Control Data sued IBM in a private antitrust action, focusing on its predatory conduct in the supercomputer and mainframe markets.[10] In 1969, after a long investigation, the Justice Department filed its own suit, also charging IBM with monopoly maintenance in violation of Section 2 of the Sherman Act.[11] According to the Justice Department, IBM had undertaken "exclusionary and predatory conduct" to maintain its dominant position in "general purpose digital computers."[12] That was a market, according to the government's estimates, in which IBM took some 70 percent of annual revenue.

Most important for our purposes were the government's allegations surrounding software.[13] IBM was accused of tying software to "related computer hardware equipment" for a single price in a manner that the Justice Department alleged to be anticompetitive. IBM, it was alleged, also gave away software for free for "the purpose or with the effect of . . . enabling IBM to maintain or increase its market share."[14]

Beyond the software practices, the government also accused IBM of predatory practices. In particular, it accused IBM of developing specific "fighting machines" designed not to make a profit but rather to intimidate would-be competitors. It also accused IBM of vaporware practices, that is, announcing "future production and marketing [of certain products] when it believed or had reason to believe that it was unlikely to be able to produce and market such products within the announced time frame."

For these violations, the government sought divestiture – that is, a full breakup of IBM into constituent parts. In that sense, the case was a classic example of the "big case" tradition in antitrust, in the model of the Northern Securities or Standard Oil litigation, whose goal was to restructure the industry entirely.[15]

[8] Kevin Maney, *The Maverick and His Machine: Thomas Watson, Sr. and the Making of IBM* (2003).
[9] Ibid at p. 423.
[10] James Cortada, *IBM: The Rise and Fall and Reinvention of a Global Icon*, pp. 332–333 (2019).
[11] The Complaint is reprinted in the appendix of Franklin M. Fisher et al., *Folded, Spindled and Mutilated: Economic Analysis and U.S. v. IBM*, 353 (1983).
[12] Plaintiff's Statement of Triable Issues (dated Sep. 23, 1974), *United States* v. *IBM*, 69 Civ. 200 (S.D.N.Y. 1969).
[13] *See* Amended Complaint, *U.S* v. *IBM*, 69 Civ. 200, ¶ 19(a) (S.D.N.Y. 1969).
[14] Plaintiff's Statement, supra note 12.
[15] *See* Wu, supra note 1.

After some six years of discovery, the case finally went to trial in 1975. The early stages of the trial were somewhat complicated by the fact that IBM was also defending the private antitrust lawsuit brought by Control Data, the manufacturer of supercomputers. At the beginning, Control Data actively cooperated with the Justice Department, and had accumulated a massive database of alleged predatory acts perpetrated by IBM and its salesmen over the 1960s. It was information from this file that the Justice Department hoped to deploy in its lawsuit. However, in 1973, Control Data settled with IBM, and agreed to hand over its file.[16] IBM immediately destroyed (in some accounts burned) the files, thereby setting back the Justice Department's discovery.

During the trial, IBM put on a vigorous defense, and spent untold millions of 1970s' dollars defending the case.[17] The judge, David Edelstein, permitted the calling of a seemingly unlimited number of witnesses, for indefinite periods of time. One government witness testified for more than six months. Other trial days consisted of reading of depositions into the record.[18] Many of these details were chronicled by legal writer Steven Brill, in a scathing piece that portrayed the entire trial as a complete fiasco, or, in his words, "a farce of such mindboggling proportions that any lawyer who now tries to find out about it … will be risking the same quicksand that devoured the lawyers involved in the case."[19] The trial continued for an astonishing six years, until the Justice Department finally rested in 1981.[20]

But here we are interested less in the trial itself, and more in the effects of the litigation on IBM's conduct and decision making. For during the lengthy trial and its aftermath, there is little dispute among business historians and journalists that IBM's management was influenced by the very fact of being under investigation and being on trial. As Don Waldman writes, "the filing and prosecution of the antitrust case affected IBM's business behavior for the next twenty years."[21] Furthermore, as he writes, "lawyers gained control over even the most technical elements of IBM's business."[22] William Kovacic concurs: "DOJ's law-suit exacted a high price from IBM. Along with the private lawsuits, the DOJ case caused IBM to elevate the role of lawyers in shaping commercial strategy and seems to have led the firm to pull its competitive punches."[23] Reporter Paul Carroll, in his insider account *Big Blues*, gave a detailed portrayal of the effects of efforts to avoid strengthening the antitrust

16 James Cortada, *IBM: The Rise and Fall and Reinvention of a Global Icon*, p. 333 (2019).
17 Ibid at p. 331.
18 *See* Fisher, supra note 7, at 16.
19 Brill, supra note 2, at 1.
20 Peter Behr, IBM, Justice Rests Cases In Historic Antitrust Trial, *Wash. Post* (June 2, 1981), available at https://www.washingtonpost.com/archive/business/1981/06/02/ibm-justice-rests-cases-in-historic-antitrust-trial/5cc16db0-8e7f-4763-a17d-fdfb6fef0464/?noredirect=on.
21 Don Waldman, IBM, in *Market Dominance: How Firms Gain, Hold, Or Lose it and the Impact on Economic Performance*, p. 140 (David Ira Rosenbaum, ed., 1998).
22 Ibid.
23 Andrew I. Gavil, William E. Kovacic, Jonathan B. Baker, Antitrust Law in Perspective: Cases, Concepts, and Problems in Competition Policy 1112 (2008).

case by producing evidence of market share or anticompetitive conduct: "Lawyers, who were developing a stranglehold on the business, decided what could be said at meetings. No one could talk about IBM's market share, or if they did, they'd talk in meaningless terms, describing the market for word processors as though it included everything from the supercomputer on down to paper and pencils. Executives couldn't do any competitive analysis. Developers weren't allowed to buy a competitor's machine; they were just supposed to know what was in it."[24]

Critics have emphasized the sheer size of the case, which did last an astonishing thirteen years, at the end of which, the Reagan Administration simply dropped the case.[25] Was it, then, all just a waste of resources? That's no trip to the county courthouse, and no one can defend how the Justice Department managed the litigation, which became as bloated as a 1970s' muscle car. On the other hand, consider the stakes: The computer and software industries were already bringing in billions in revenue and today are collectively worth trillions of dollars, encompassing many of the most valuable companies on earth. Small effects on this industry would and did have major long-term effects. Neither was the IBM case, as G. David Garson writes, "without its effects" for the early computing industry.[26]

EFFECTS AND IMPACT

It is one thing to suggest that the IBM trial may have caused IBM to behave more cautiously, evade obvious anticompetitive conduct, and generally avoid strengthening Justice's case. Among other things, that may simply have weakened IBM as a competitor. But it seems more important to point out specific decisions and outcomes that seem to have been strongly influenced by the "antitrust phobia" resulting from being the subject of a Sherman Act case designed to break up the company. In this section I focus on three key moments: (1) IBM's unbundling of software from hardware, (2) its entry into the microcomputer market, IBM PC, in partnership with Microsoft and others, and (3) its pattern of non-acquisitions in the aftermath of the PC's success.

Unbundling and the Rise of an Independent Software Industry

The clearest impact of the antitrust case was its contribution to the rise of an independent software industry. This development is no small matter, given that software today is a $1.2 trillion-dollar industry in the US ($3 trillion globally), employing 2.5 million people. However, most of the legal and economics critics of

[24] Paul Carroll, Big Blues: The Unmaking of IBM 57 (1994).
[25] Cortada, supra note 16, at p. 346.
[26] G. David Garson, Public Information Technology and E-governance: Managing the Virtual State 229 (2006).

the IBM litigation have, unaccountably, failed to acknowledge the case's contribution to the software industry.

In the 1960s, it was IBM's practice, and the practice of most other mainframe manufacturers, to "bundle" software with hardware.[27] That is, software was sold as a service that was tied to the sale of its hardware – the IBM mainframe unit came with a contract by which IBM programmers wrote software customized to the needs of the customer. Any prepackaged software was meant merely to illustrate for the customer what software might look like, like a model home for a prospective customer.[28] There were those within IBM who also thought that there might be a profitable market for packaged software, but they were unable to persuade the firm to break from its traditional practices.[29] The software industry itself was a "small, offbeat, almost cottage industry" and there was, interestingly, little customer demand for independent software.[30]

In the late 1960s, as it became apparent that the Justice Department was planning on bringing an antitrust lawsuit, IBM's legal team began to conclude, as a legal matter, that the software–hardware tie would be difficult to defend. A key figure was IBM's general counsel, Burke Marshall, who "saw bundling as a glaring violation of antitrust law" and suggested that, if forced to defend the tie, IBM "would lose."[31] Faced with this assessment, and hoping for a quick settlement, IBM President and CEO Thomas Watson Jr. made the decision, late in 1968, to begin the process of unbundling IBM's software offerings from its hardware offerings.[32] While the unbundling decision was made before the formal filing of complaint, it was an effort to avoid the complaint's being filed; such efforts to settle preemptively as is common in antitrust practice.[33] If there was once some controversy over why IBM unbundled, Watson's description of the decision, in his autobiography, coupled with the writings of other IBM insiders, seems to have settled the matter.

[27] In antitrust jargon, bundling and tying are differentiated by the idea that tying is non-optional, while a bundle allows the customer to buy the constituent products separately, or in a (usually cheaper) bundle. However, in business usage, the two terms are used interchangeably, and in this piece "bundling" is used as a synonym for "tying."

[28] Burton Grad, A Personal Recollection: IBM's Unbundling of Software and Services 24. *IEEE Annals of the History of Computing* 64, 66 (2002).

[29] Ibid at p. 67.

[30] Stanley Gibson, Software Industry Born with IBM's Unbundling, *Computerworld*, 6 (June 19, 1989).

[31] Thomas J. Watson Jr. and Peter Petre, *Father, Son & Co.: My Life at IBM and Beyond* (1990). There were also some within IBM who thought that the firm was missing out on an opportunity to make money in software. *See* Grad, supra note 28, at p. 65.

[32] There was, at some point, controversy over what caused IBM to unbundle software. In 1983, Fisher, McKie, and Mancke disputed the argument that it was antitrust pressure, and suggested that cutting the costs of support was the primary motive. *See* Franklin M. Fisher, James W. McKie, and Richard B. Mancke, *IBM and the U.S. Data Processing Industry: An Economic History* (1983). However, later admission in Watson's autobiography and corroboration by insiders like Grad seems to have ended the controversy.

[33] For example, in the 2010s, when under FTC investigation, Google preemptively abandoned several practices that investigators had deemed anticompetitive. *See* https://www.vox.com/2017/12/27/16822150/google-ftc-yelp-scraping-antitrust-ftc.

On June 23, 1969 – sometimes called the "independence day" for the software industry – IBM, for the first time, made seventeen applications independently available for lease (not yet for sale). With the first release of prepackaged software products by the world's dominant computer firm, the world of computing was never the same again. Richard Lilly, founder of a prominent 1970s software firm, said in 1989, "It created the industry we're in."[34]

Consistent with Lilly's statement, most experts agree that IBM's unbundling was one key factor in the development of an independent software industry.[35] Nonetheless, a few caveats are in order. First, it is not that IBM was the first firm to release software as a product – there were others, albeit very few. By becoming the largest firm to enter the industry itself, IBM played a role in validating the idea that software could be a product at all, and also the idea that software was valuable. Second, it is also true that there were other factors necessary for the birth of a software industry. One was IBM's own development of the 360-mainframe architecture, which was a standardized platform; another, the rise of the minicomputer, a smaller and cheaper alternative to the mainframe. Nonetheless, in its action, IBM both gave life to the industry and, critically, reconceptualized what software was. Its unbundling, as Martin Campbell-Kelly writes, transformed "almost overnight the common perception of software from a free good to a tradable commodity."[36] The decision also had important consequences for IBM, both in terms of what it was and what it could control. As Burton Grad, of IBM, writes: "As a consequence of unbundling, IBM unquestionably became the largest supplier of computer software and services during the 1970s and 1980s. However, it never could control that business in the same way that it had (and has) dominated the mainframe hardware market."[37] The ongoing antitrust suit, moreover, prevented IBM from rebundling and risking new liability. Hence, the suit and the unbundling helped create the model of computing that drove development through the 1970s and beyond – the concept of a *platform* for which *applications* are developed.

Estimating the economic importance of this development – and the contribution of IBM's unbundling – is not easy, if only because the transformation was so far reaching. An important fact, however, is that the impact was not felt all at once. Hardware continued to be more important than software, and even into the 1980s, the software industry remained relatively small. One economic analysis suggests that "in 1987, the receipts of U.S. software programming service companies (SIC 7371) were $14.2 billion, the receipts for computer integrated systems design (SIC 7373) were $7.1 billion, and the receipts from prepackaged software (SIC 7372) sales were

[34] Gibson, supra note 30, at p. 6.

[35] *See*, e.g., Grad, supra note 28; *see also* W. Edward Steinmueller, The U.S. Software Industry: An Analysis and Interpretive History, in *The International Computer Software Industry: A Comparative Study of Industry Evolution and Structure* (David C. Mowery ed., 1995).

[36] Martin Campbell-Kelly, Development and Structure of the International Software Industry, 1950–1990, 24 *Bus. & Econ. History* 73, 88 (1995).

[37] Grad, supra note 28, at p. 71.

$5.9 billion."[38] Other developments, like the triumph of the personal computer over all aspects of business computing, were yet to come. Yet by the 2010s, providers of software, even narrowly construed, were responsible for over a trillion dollars in US revenue, and broadly construed, far more of the world's economic activity. In the words of Marc Andreessen, "software is eating the world."[39]

We cannot know for sure whether, without IBM's decision, software would have become unbundled anyhow – that it was, in some way, the natural order of things. But it seems hard to deny that the antitrust case sped that development. And the failure to take account of the significance and effect of IBM's unbundling of its software is a major flaw in many of the critiques of the IBM litigation. Take, for example, the work of economic historians Robert W. Crandall and Charles L. Jackson and their highly skeptical analysis of the effects of the IBM antitrust litigation, published in 2011, on the computing industry. The two do mention that unbundling was among the Justice Department's goals, yet fail to even mention that it actually achieved this goal. That omission allows them to make the incorrect conclusion that: "It is difficult to see how an antitrust action brought in 1969 and dismissed in 1982 could have been a major contributor"[40] to dramatic changes in the industry.

* * *

If unbundling succeeded in transforming the history of computing, unfortunately for Watson and IBM, it failed in its goal of mollifying the Justice Department, which persisted with other claims of predation and anticompetitive behavior. It seems that the Justice Department continued to litigate based on its large collection of potentially predatory activities – in particular, related to pricing and misleading consumers about IBM's forthcoming supercomputers (a vaporware strategy). The persistence of the lawsuit led to its influence over another transformational development: The arrival of the personal computer.

The Personal Computer and Microsoft

Another major development that occurred during the pendency of the IBM antitrust lawsuit was the development of the personal computer industry. While Apple and competitors Commodore and Tandy may have ignited the market with the successful launch of the first mass market personal computers, IBM would come to play a central role by developing and releasing the IBM PC, the personal computer whose design would come to dominate the market, with its radically modular, or

[38] Steinmueller, supra note 35, at p. 7.

[39] Marc Andreessen, Why Software is Eating the World, *Wall St. J.* (August 20, 2011), available at https://a16z.com/2016/08/20/why-software-is-eating-the-world/.

[40] Robert W. Crandall and Charles L. Jackson, Antitrust in High-Tech Industries, 38 *Rev. Ind. Organ.* 319, 327 (2011).

open, design. This section examines the influence of IBM's "antitrust phobia" over the core decisions made during this period.

There are two dominant, and conflicting, narratives surrounding the development of the personal computer. The first lionizes IBM's rapid creation of a personal computer that would come to dominate the new industry. The second describes a blundering IBM, and credits Bill Gates for his brilliant outwitting of a myopic and foolish IBM based on an inability of the latter to understand the future. It isn't hard to see the contradiction: If IBM was too stupid or backward to understand the personal computer market, how did it come to dominate it in just a few years? And if Bill Gates had such a brilliant sense of the future, why did he only grudgingly come to understand the potential in selling a standardized operating system? But most mysterious of all: Once the IBM PC began to take off, why was it so inert in the defense of its position? Why, for example, did it decline to acquire control of the companies critical to the PC, as IBM's philosophy of centralized control would suggest? The point of this section is not to suggest that the traditional narrative is entirely wrong, but that it is incomplete. Particularly when it comes to Microsoft, it implies that IBM was simply too bone-headed to appreciate the future, rather than, potentially, concerned about its fate in the antitrust trial, and later, the possibility of reigniting antitrust litigation. There were so many dogs that did not bark during the launch of the PC and its aftermath, many of which are consistent with a fear that too aggressive a posture might yield renewed antitrust pressures based on the monopolization of the PC markets or software.

A moment, first, on the IBM PC itself and its significance. IBM, as already discussed, was the great champion of the mainframe computer – "big iron," the monster machines designed to serve the needs of an entire business unit. (To be fair, mainframes were actually much smaller than the computers of the 1950s, which sometimes took up entire buildings, and were employed mainly by the military, but that is another matter.) Priced in the millions of dollars, they were obviously not intended for home usage. In the late 1960s through the 1970s, however, a number of researchers, particularly those associated with Xerox's Palo Alto Research Center, and hobbyists like Steve Jobs and Steve Wozniak, had come up with the idea of a "personal" computer, intended for individual usage or for small businesses. A group of firms, led by Apple and its introduction of the Apple II, and also including Commodore, Atari, Sinclair, Tandy, and others, had by the 1970s proved both that personal computers could be produced for less than $2,000, and that there was a market for them.

IBM had experimented with smaller, entry-level computers, but they were generally smaller versions of its mainframes, and still priced way beyond the reach of any individual. In 1980, with the success of Apple and others, IBM decided to enter the microcomputer market in earnest. In an impressive twelve months, it had introduced the IBM PC, coupled with an advertising campaign featuring Charlie Chaplin's "Little Tramp." More powerful than the Apple II or Commodore 64,

and soon the beneficiary of a "killer app" in the VisiCalc and then Lotus 1–2-3 spreadsheet program for businesses, the PC would soon become the best-selling personal computer in history to that point, and the dominance of its design had a profound influence on the subsequent history of computing.

What made that design so interesting is that the IBM PC was built in a manner unlike any other IBM product, a fact that would have enormous long-term consequences for the industry. As suggested earlier, IBM, whose system design traditions dated from the 1950s, has been among the champions of a fully integrated system design. Like AT&T, the company whose design philosophy was the most similar, IBM had long believed that the best products required that every component and service be provided in-house. Its practice of bundling, stated differently, was not limited to software; it included all hardware as well – it tended to source all of its hardware and software from itself.

The first IBM PC, however, was an extraordinarily radical break from that design, with a modular, open design philosophy that was essentially the opposite of IBM's closed and centralized philosophy. The IBM PC team (as we shall see, an experimental subunit of IBM proper) selected a hard drive manufactured by Seagate, a printer made by Epson, and a processor made by Intel, instead of using its own hardware. Most importantly over the long term, an operating system provided by the company then named "Micro-Soft," then a small startup, headed by one Bill Gates who was just twenty-four at the time and lacking a college degree. Gates, for his part, did not, in fact, write the operating system, but acquired it from a partner (Seattle Software) to whom he paid a license of $25,000 (reportedly, he didn't mention to Seattle Software that the customer was IBM, or that it had paid him $700,000).[41] In the end, when the PC came out, only the keyboard, screen, motherboard, and its hardware BIOS (Basic Input Output System) were actually produced by IBM's internal divisions. Of those, only the BIOS was proprietary.

There is one competitive detail of particular importance in the story of the IBM PC. When IBM contracted with Microsoft to provide the main operating system for the computer,[42] it neither bought the rights to the software nor required an exclusive license. The agreement was, instead, nonexclusive, leaving Microsoft free to sell its MS-DOS to other computer manufacturers as well. This nonexclusivity was a crucial factor in facilitating competition in the market for IBM-compatible PCs (like Compaq, or Dell). But this is something of a tangent. The question this chapter is trying to assess is what role, if any, the antitrust investigation played in influencing IBM's original design and subsequent strategic conduct. Unlike unbundling, the causation is much more diluted, but no less important.

[41] Mat Honan, Bill Gates Spent the Best Money of His Life 30 Years Ago Today, *Gizmodo* (July 27, 2011).

[42] The IBM PC was actually offered with three operating systems, but Microsoft's was the cheapest ($40) and may have been the default, for it quickly became the dominant choice. Eric G. Swedin and David L. Ferro, *Computers: The Life Story of a Technology*, p. 95 (2007).

First, we do need return back to the original 1969 software unbundling and its effect on the development of the personal computer. Among the effects of IBM's prior unbundling decision was to create the conditions for the platform/application model that would become the foundation of the personal computer industry. Burton Grad, again, writes that "[u]nbundling mainframe software established a framework for the independent microcomputer software industry's later growth, which followed the model of separately priced offerings by major software suppliers."[43] In other words, perhaps the larger influence of unbundling in 1969 was setting a model for firms like Microsoft, VisiCalc, and Lotus (the last two being among the first spreadsheet producers) to follow, which were a major factor in the success of the IBM PC. The unbundling also made possible Microsoft, which we shall discuss in greater detail in a moment.

The second matter was the question of how IBM would come to enter the market for personal computers. A dominant view is that the industry had too little revenue to attract or interest a mighty firm like IBM. However, there is evidence that, as early as the mid-1970s, IBM management, including its chairman, had gained interest in low-cost, entry-level computers, based on the accurate perception that lower-cost computers would come to be important, and also that rival Xerox might dominate that market. (Xerox had developed an advanced personal computer, the Alto, by 1973, that even had a graphical user interface, but had kept it for internal use, and did not bring a computer to market until the mid-1980s.) IBM considered the acquisitions that might help it forestall the emergence of competitors, but that path was discouraged by its lawyers, who were at that point involved in every level of decision making. For example, IBM considered the acquisition of Atari, and later considered working with Atari to produce its PC, but never did so – whether out of antitrust concerns or not, is unclear.

The IBM PC's production was also influenced by IBM's internal restructuring. By the late 1970s, both in the hope of promoting innovation, and also in anticipation of a potential breakup, IBM had divided the firm. Frank Cary, IBM's CEO, created a separate division to contain all of IBM's non-mainframe businesses, and it was in this division that the PC was launched. More specifically, IBM created a series of independent business units designed to be innovative and also potential survivors of a breakup, just as AT&T concentrated its choice assets (or so it thought). It was one of these, the "entry level computing" division based in Boca Raton, Florida, that both proposed and then built the IBM PC (codenamed *Project Chess*).

It is this team that made the decisions to create the modular and open design already discussed. That decision, in turn, is said to have been somewhat inspired by both Wozniak's Apple II design as well as the *Chess* team's desire to get around IBM's slow-moving methodical culture and arrive to market quickly and cheaply. The evidence leaves little doubt that this was the primary reason behind the design.

[43] Grad, supra note 28, at p. 71.

As Bill Lowe, the first head of the PC team, later said: "[A]t IBM it would take four years and three hundred people to do anything, I mean it's just a fact of life. And I said no sir, we can provide with product in a year. . . . To save time, instead of building a computer from scratch, [the team] would buy components off the shelf and assemble them – what in IBM speak was called 'open architecture.' IBM never did this."[44] Lowe explained that "the key decisions were to go with an open architecture, non-IBM technology, non-IBM software, non-IBM sales and non-IBM service."

But while speed was surely a predominant factor in the design, it does not provide an explanation for everything. It fails to explain certain matters, like the crucial agreement to a nonexclusive license for Microsoft's PC-DOS (an exclusive contract would not have been slower), and to leave Microsoft with full control of the source code. Those who have studied that agreement and its creators have tended to focus on Bill Gates' side of the story, and attribute to him great savvy and foresight, based mainly on his own testimony.[45] While seeing the potential in the operating system and in nonexclusivity deserves enormous credit, it doesn't explain why IBM would agree to such a thing. It takes two parties to reach agreement, and as a small firm negotiating with the dominant computing power, it is safe to say that Microsoft would not necessarily have the final say. We also have the fact that IBM made an offer to buy a competing operating system, CP/M, outright.[46] What is lacking is a reason for IBM's non-assertion of its market power, and the implicit assumption that IBM was simply too stupid or short-sighted is an inadequate explanation.

The studies of IBM's side of the deal and its motivations for agreeing to non-exclusivity are fewer, but more important for our purposes. Joseph Porac, in a comprehensive study of the deal, suggests a variety of factors. One was that IBM did not want to manage the code or develop the operating system itself, having had several bad experiences with doing so in recent years. But the other leading reason, according to Porac, was "antitrust phobia." As he writes: "[A] reluctance to over-control small companies that could become potential competitors [was an] offshoot of the company's antitrust phobia. Signing a nonexclusive contract with Microsoft that was clearly to Microsoft's benefit was one way of avoiding any future claim that IBM was dominating the personal computer market."[47] His assertion is echoed by Charles Ferguson and Charles Morris, who write: "[B]ecause of the still-pending antitrust action, IBM was wary of owning operating system software for fear of suits

[44] Robert X. Cringely, "Triumph of the Nerds: The Rise of Accidental Empires," *PBS* (June 1996), http://www.pbs.org/nerds/part2.html.

[45] Walter Isaacson, The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution 360 (2015).

[46] Eric G. Swedin and David L. Ferro, Computers: The Life Story of a Technology 95 (2007).

[47] Joseph F. Porac, *Local Rationality, Global Blunders, and the Boundaries of Technological Choice: Lessons from IBM and DOS, in Technological Innovation: Oversights and Foresights* 129, 137 (Raghu Garud et al. ed., 1997).

from software writers" for "IBM was extremely sensitive to even the appearance of having an unfair advantage over a small supplier."[48]

It is difficult, in the final analysis, to deny that IBM's antitrust lawyers strongly influenced elements of the legal and technical design of the IBM PC, for it was essentially antitrust-proof. Indeed, after IBM's successful rise to dominance in the PC market, there was some complaining about "IBM dominance" but no serious antitrust scrutiny or assertion that the firm had employed tying or other exclusionary strategies. The avoidance of even a hint of exclusivity in the design is notable. It is the non-assertion of market power or obvious failures to protect itself from competition that suggest a firm exceptionally intent on avoiding anything that might strengthen the antitrust case against it. Unfortunately for IBM, but fortunately for the economy, the very design of the PC made it much harder for IBM to control the PC market.

The Non-Acquisitions, and More Dogs that Did Not Bark

In 1984, after the success of its PC, IBM was unquestionably the world's dominant computer firm. In fact, at that point, IBM was the world's single most valuable company, its stock price rising to $79 billion by the end of that year. It had upended the personal computer industry, and achieved, for a while, a dominant market share in that market. The last point we consider, in terms of the lasting effects of antitrust scrutiny, was IBM's astonishing failure to take some of the classic measures used by a monopolist to defend its market position.

As already suggested, IBM entered the market in a manner that can only be described as unusually and exceptionally stimulating to competition, and indeed in a manner that breathed life into firms and nascent industries. The level of competition ended up being much greater than IBM could possibly have anticipated. Some of this was surely a blunder on the part of IBM. A key matter was IBM's assumption that its ownership of the BIOS code would protect it from those seeking to create 100 percent IBM compatibles, based on the premise that it might use copyright infringement lawsuits to block any direct copies. However, Compaq and other firms effectively reverse-engineered and cloned IBM's BIOS, using clean-lab techniques (that is, its engineers had no access to the relevant code).[49] This development, which IBM clearly did not anticipate, created a major breach in the barriers to competition it thought it had, and yielded a flourishing PC market from the 1980s onward.

[48] Charles H. Ferguson and Charles R. Morris, Computer Wars: The Post-IBM World 26, 71 (1993). *See also* Eli M. Noam, Media Ownership and Concentration in America 187 (2009).

[49] For a description of one firm's cloning techniques, *see* James Langdell, *Phoenix Says Its BIOS May Foil IBM's Lawsuits*, PC NEWS (Jul. 10, 1984), available at https://books.google.com/books?id=Bwng8NJ5fesC&lpg=PA56&ots=_i5pxGorF7&dq=ibm+pc+program+use+extra+bios+chip&pg=PA56&hl=en#v=onepage&q&f=true.

An easier way to protect its dominance would have been control over Microsoft's DOS,[50] and we have already discussed IBM's decision not to insist that the Microsoft's DOS be exclusive to IBM, or even partially exclusive. That single decision, as many have noted, might have ensured a far longer domination of the PC market for the firm. But even if this might have been, in part, at least an oversight, it is hard to explain IBM's subsequent non-acquisition of PC-DOS, of Microsoft, or even of a share of Microsoft, without crediting some concern of renewed antitrust problems.

In the 1990s, reporters first revealed that, in fact, IBM was offered various opportunities to buy Microsoft or its software. In 1980, according to the *Wall Street Journal*, Microsoft offered to let IBM buy its operating system outright, an opportunity that IBM declined, for the reasons discussed above. Later, in 1986, after the IBM PC had successfully taken over personal computing, Bill Gates offered IBM the opportunity to buy 10 percent of Microsoft.[51] There is some reason to think that, while surely the price would have been steep, IBM might have even have tried to acquire Microsoft in its entirety. IBM – still the most valuable firm in the world – demurred, concerned that its purchase would reignite antitrust concerns by being seen as "throwing its weight around."[52] Paul Carroll reports Bill Lowe of the PC team stating that "IBM didn't want to be seen as dominating the PC market too thoroughly."[53]

Given the runaway success of the PC, it was also plausible that an IBM that was behaving more like Facebook, Microsoft, or other less inhibited giants would have sought to either acquire or clone the other units, including hard drive manufacturer Seagate, and Epson. However, it made no efforts whatsoever to acquire these actors, which would go on to earn most of the profits in the PC industry.

* *

The various design decisions surrounding the IBM PC and IBM's subsequent failure to defend its position are of such great importance over the long term for both the computer industry and the entire high-tech economy that they must be carefully examined.[54] We have already noted that the nonproprietary design left the market open to challengers to the IBM PC, which manufactured cheaper but compatible computers, also using MS-DOS. Over the long run, this development would erode IBM's early dominance. But more generally, an important consequence was the fostering of a whole series of new and independent industries: an industry for hard

[50] A contrasting theory, not explored further, is that exclusivity would have hindered the spread of the PC platform, or perhaps made CP/M rivals more successful.

[51] Don E. Waldman, The Rise and Fall of IBM, in *Market Dominance: How Firms Gain, Hold, or Lose It and the Impact on Economic Performance*, p. 141 (David Ira Rosenbaum ed., 1998).

[52] Ibid.

[53] Carroll, supra note 24, at p. 57.

[54] *See*, e.g., Jimmy Maher, The Complete History of the IBM PC, *Ars Technica* (July 31, 2017), https://arstechnica.com/gadgets/2017/06/ibm-pc-history-part-1/.

drives and other forms of storage, another for processors and memory, and, of course, the market for personal computer software. It is true that these industries existed previously, but their growth was catalyzed by the IBM PC and its later competitors. It is interesting to contrast the PC, in this respect, with Apple, the previous leader, which was slightly less open than IBM, and with the launch of the Apple Macintosh, retreated to an entirely closed architecture with most components manufactured by Apple. In an alternative universe without IBM, had some version of the Apple Macintosh became the dominant business computer, it is very possible that the storage and software industries, in particular, would have been greatly reduced in independence and significance.

LESSONS FOR ENFORCERS

Today, the concentration of the high-tech industries has become, one again, a matter of major public concern. That's why the IBM case merits careful study by enforcers, for it was the first major tech antitrust case of the computing era, and a neglected member of the big three cases of the late twentieth century (IBM, AT&T, and Microsoft). Close study of the case offers guidance and insight into what might be the dynamic justifications for bringing a major antitrust lawsuit in the 2020s.

IBM was just one company. Yet, in retrospect, it was sitting atop what turned out to be an enormous number of important industries, from software through storage, processing and operating systems. The subsequent flourishing of the industries that were once in areas controlled, or potentially controlled, by IBM has unquestionably transformed the modern economy.

Given the complexity of any historical period, it is almost always impossible to claim that one factor – one leader, one case, one invention, or one critical decision – changed everything. However, it is not impossible to claim a contribution or a catalyst. And even if we don't know what would have happened in the absence of antitrust – if, in fact, software might have been unbundled anyhow, or the PC might have developed more or less the same – there is good reason to believe that the pervasive evidence of antitrust phobia hastened the outcome.

If an enforcer wanted to duplicate the catalytic effects of the IBM case, what would he or she do? A close look at the history recommends that antitrust enforcers, particularly when thinking about big Section 2 cases, should spend time thinking about what industries or potential future markets and industries the dominant firm sits on top of or can potentially control the development of. The intuition is that there is a difference, say, between a shoe monopoly and monopoly on sidewalks, given that the latter might be an input into and entwined in so many other businesses. This suggests that antitrust enforcers should, when considering cases, begin by thinking about how many markets are influenced or dependent on the product or service.

A similar logic suggests prioritizing Sherman 2 cases where the problem isn't just competition in the primary market, but where competition in adjacent markets looks to be compromised or threatened. The long cycles of industrial history suggest that what are at one point seen as adjacent or side industries can sometimes emerge to become of primary importance, as in the example of software and hardware. Hence, the manner of how something is sold can make a big difference. In particular, "bundling" or "tying" one product to another can stunt the development of an underlying industry. Even a tie that seems like "one product" at the time the case is litigated, as, for example, software and hardware were in the 1960s, or physical telephones and telephone lines, might contribute to such stunting. If successful, an antitrust prosecution that breaks the tie and opens a long-dominated market to competition may serve to have very significant long-term effects.

While all things are clearer in retrospect, the existence of a cottage or nascent industry might serve as a clue that, in fact, a vibrant industry might emerge from breaking the tie. If some firms manage to survive even in the presence of a tie, that suggests the possibility that there is far more potential there. In the example of the software industry, as we've suggested, the concept of prepackaged software existed, and a scattering of firms sold it and made a profit thereby. That pattern suggested plenty of room to grow, even if it would take many years for premade software to develop into the thriving industry it became.

A last lesson that might be gleaned from the IBM litigation is this: If the government wants to spur a change in conduct, it should seek maximum remedies in the cases it brings. In *IBM*, the Justice Department brought a complaint seeking dissolution – a full structural remedy. IBM's concern about such a remedy had a major effect on its thinking and decision making, and seemed to yield the antitrust phobia that proved important over the 1970s. That suggests that the Justice Department cannot induce improved behavior without making credible threats of punishment at the outset of the case. In particular, there is a risk that a case that begins seeking a mere consent decree might not have any real effect on firm conduct.

A full discussion of what should go into case selection is beyond the scope of this or perhaps any article. But the final caveat or warning is this: While I think it is correct to suggest that the costs of litigation should not be fetishized – although the millions matter less when there are billions at stake – one thing that does matter are the effects on the company itself. IBM was, arguably, a reduced entity during the antitrust case (although it remained extremely profitable, and actually quadrupled its stock price). Knowing that the effect of litigation is to damage the firm, the enforcer needs to have some confidence that the damage will be salutary – that is, it will yield room for competitors to take the ball and run with it. While "do not harm" cannot be the mantra of antitrust enforcement, no one should seek outcomes that make things worse. And this is what makes timing all important, and suggests that enforcement policy will always be a matter requiring, above all, good judgment and a clear eye toward what one hopes to achieve.