The Battle over Control of Code is a Battle over Freedom

Howard Rheingold

The battle for the control of code is the decisive battle in a war that most people don't know about yet, a conflict that will shape the world we and our descendants will inhabit in coming decades—a war over the freedom to innovate. Most people in 2003 take for granted that we can all use personal computers and the Web today because people like Doug Engelbart and Tim Berners-Lee didn't have to ask for permission before they invented new media for thinking and communicating. Computers and telephones are not just power tools, but mind-power tools: the liberty to invent and deploy new communication media is significantly different from the license to invent other kinds of products and services. A television channel, a weblog, a java program, a World Wide Web is not a breakfast cereal, a railroad, a microchip—but an avenue for learning, a channel for communication, a means to persuade, and a vehicle to self-organize, all at the same time. The products of the media and communication industries are states of mind and social relations. When you can control or influence people's state of mind and social relations, you unlock the gateway to power over them.

The most important questions concerning the future of communication technology and the media they enable are, more than ever, questions of power and liberty:

- Who will be free to innovate? Entrepreneurs, or employees?
- Will people who purchase tools and experiences remain active users of technology, reshaping and evolving media to our own purposes, or will we be turned back into passive consumers, whose only choice is which brand to buy from a small number of vendors?
- Will mobile communication media and pervasive computing enable entire populations to organize collective action, or will such collective action be prevented, channeled, and metered by laws and code?

Legal, political, and regulatory moves to protect the owners of today's technology and yesterday's business-models are attempting to thwart the process of capitalistic "creative destruction" whereby cheaper, more powerful, more effective products and services replace older, less valuable ones:

- The move by incumbent license-holders to lock up radio spectrum, using laws formulated to regulate technology of the 1920s, rather than open large amounts of spectrum to WiFi, ultra-wideband, cognitive radio, mesh networking, and other potentially disruptive technologies is one front of the assault on the freedom to innovate. Spectrum is the real estate of the mobile-and-pervasive age.
- The battle to criminalize the sharing of computer resources over the Internet is about control of collective action of the kind that built the Web. Preventing p2p through legal and technical restriction could shut down distributed research into cancer cures, along with college students exchanging music.

- The already existing Digital Millennium Copyright Act in the USA and in its global versions, instantiated in near-future hardware through the "secure computing" schemes, along with the Broadcast Flag and other Digital Rights Management proposals, are battles over whether only certain existing companies or whether individuals and companies-to-be will be able to create and distribute cultural products—and whether lawmakers, under pressure from lobbyists, can force all future chip manufacturers to embed code police and police code in their hardware.
- The moves by broadband cable and telephone infrastructure operators that also own companies that sell broadband to compromise the Internet's end-to-end principle is an assault on the fundamental code architecture that enabled the Internet, and the Web to grow and flourish through the aggregated and coordinated invention of millions of people. The enclosure of the Internet commons is on its way to being encoded in the routers that move bits around—the hardware gateways that make the Internet possible.

Will tomorrow's artists, engineers, teachers, designers, political leaders, citizens, technology users, continue to be free to invent tools like the personal computer or the Internet, or will law and code restrict the freedom to innovate? Although the two most powerful instruments of code—the personal computer and the Internet—originated in the US military, and were built on infrastructure constructed by companies like IBM and ATT, ultimately the PC and the Internet became mass media because millions of computer and Internet users reinvented these media for their own purposes. From nineteen year-old Harvard dropout Bill Gates taking control of computers away from IBM, and equally young Steve Wozniak and Steve Jobs making PCs "for the rest of us"—computers that people who had never used computers started to use to do things computers had never been used to do—to Tim Berners-Lee creating the World Wide Web and giving it away, the PC and the Net have been shaped by its users. Unix, Linux, Usenet, Yahoo, Google—commercial and gift-economy—were created by individual inventors and tribes of collaborators.

The PC and the Net are not just technologies with their own significant powers, they are the means of production and distribution of new inventions, the instruments of "bootstrapping" Engelbart envisaged forty years ago. The explosion of invention that brought us from the Apple II to the Pocket PC, from the 300 baud modem to the multimegabit/second broadband connection happened because affordable tools, willing tinkerers, and a legal and cultural atmosphere that encouraged individual innovation came together. We cannot assume that these conditions for grassroots innovation will continue to exist as we move into the most technically powerful media revolution: when billions of people walk around carrying or wearing multimedia devices thousands of times more powerful than today's desktop computers, linked to other people and devices through a wireless network thousands of times faster than today's broadband Web, will freelancers remain free to tinker—will people be free to self-organize our own ad-hoc networks of people and devices? Or will we have to work for one of a few global disinfotainment factories to be free to create and enable cultural production—but not to own them?

Especially in this age of mobile communications, the freedom to innovate—and the move to constrain that innovation—operates on the level of collective action as well as the level of individual initiative. The balance of self-interest and cooperation that made enterprises like markets, nations, constitutions and corporations possible also drove the growth of today's mediasphere. The companies that made the hardware, owned the connections, sold access, although they reaped profits, did not build today's mobile, self-evolving,

self-organizing, datacloud. Hundreds of millions of people did that because others built tools that enabled people to communicate with each other in new ways through their PCs, to publish web pages, create new operating systems. At the core of the rapid evolution of the Net were tools created deliberately to afford collective action: Unix, TCP/IP, the Web, free/open source software all grew through the collective actions of those who built and used them. The end-to-end model conceded in the very architecture of the Internet that future users would think of things to do with the medium that its original architects never dreamed of, and wisely did not wall out.

Although the recording industry is interested only in its business model, and paints the post-Napster legislative and judicial attacks on peer-to-peer file-sharing as a battle solely over intellectual property, the liberty to interconnect our PCs and mobile devices into legitimate and powerful confederations like *http://folding.stanford.edu* is also at stake. Nobody today can imagine what kind of medical research, scientific exploration, technology development might be possible when the whole worldwide swarm of personal supercomputing communicators can pool their computation and communication power. But the kind of draconian control of peer-to-peer applications being pushed today by the recording and motion picture industries, if concretized into laws as bad as the DMCA, could severely hamper the freedom of computational association.

Increasingly, however, some of the software, communication, and entertainment interests that owe their power to these tools are combining architectural, legal, and regulatory machinery to prevent new enterprises and technologies from seizing that power. Western Union didn't succeed in stopping telephony. The motion picture industry didn't stop the production of VCRs, although it tried. No railroad barons or buggy-whip manufacturers were able to hold back the automobile. But today, immensely more powerful global enterprises, backed up by the politicians they help elect, are combining forces to create what sounds benign, like "Digital Rights Management," or "trusted computing," but what is aimed at restricting future technological innovation to this small number of large interests. The concentration of ownership of the news media essential to free societies is moving on to concentrate ownership of invention.

The freedom to invent and to use media to organize collective action is at stake. Whether we retain these freedoms is uncertain. And if a sufficient number of people are able to understand, organize, and act, winning that freedom is not a magic ticket to a benign future for technologically-amplified collective action. I called my 2003 book *Smart Mobs* because not every group who uses media to organize collective action has socially beneficial ends in mind. Super-empowered swarms of people can lend power to democratic collective action, or to fascist collective action. The printing press made science, medicine, and constitutions possible, but the enabling technology for population-wide literacy did not eliminate bad intentions, violence, or injustice. Indeed, technology makes the production of machine guns possible as well as the production of antibiotics. Ultimately, the question about control over the codes of collective action is about whether the powers of worldwide media would be used more wisely by a few, or by many.