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# The Future of the Internet – And How to Stop It

Essay by Jonathan Zittrain, May 15, 2008

On the 9th of January, 2007, Steve Jobs introduced the iPhone to an eager audience crammed into San Francisco's Moscone Center. A beautiful and brilliantly engineered device, the iPhone blended three products into one: an iPod, with the highest-quality screen Apple had ever produced; a phone, with cleverly integrated functionality; and a device to access the Internet, with built-in map, weather, stock, and e-mail capabilities. It was a triumph for Jobs, bringing the company into a market with an extraordinary potential for growth, and pushing the industry to a new level of competition in ways to connect us to each other and to the Web.

This was not the first time Steve Jobs had launched a revolution. Thirty years earlier, the twenty-one-year-old Jobs exhibited the Apple II personal computer, the first machine for hobbyists who did not want to fuss with soldering irons: all the ingredients for a functioning PC were provided in a convenient molded plastic case.

It looked clunky, yet it could be at home on someone's desk. Instead of puzzling over bits of hardware, Apple owners faced only the small hurdle of a cryptic blinking cursor in the upper left corner of the screen: the PC awaited instructions. Some owners were inspired to program the machines themselves, but true beginners could load up software written and shared or sold by their more skilled counterparts. The Apple II was a blank slate, a bold departure from previous technology that had been developed and marketed to perform specific tasks from its first day to its last day.

Though these two inventions—iPhone and Apple II—were launched by the same man, the revolutions that they inaugurated are radically different. The Apple II was quintessentially generative technology. It was a platform. It invited people to tinker with it. Jobs (and Apple) had no clue how the machine would be used. They had their hunches, but fortunately nothing constrained the PC to the hunches of the founders.

The iPhone is the opposite. Rather than a platform that invites innovation, the iPhone comes preprogrammed. You are not allowed to add programs to the device that Steve Jobs sells you. Its functionality is locked in, though Apple can change it through remote updates. The machine was not to be generative beyond the innovations that Apple (and its exclusive carrier, AT&T) wanted. Whereas the world would innovate for the Apple II, only Apple would innovate for the iPhone.

Jobs was not shy about these restrictions baked into the iPhone. As he said at its launch:

We define everything that is on the phone. . . . You don't want your phone to be like a PC. The last thing you want is to have loaded three apps on your phone and then you go to make a call and it doesn't work anymore.

No doubt, for a significant number of us, Jobs was exactly right. For in the thirty years between the first flashing cursor on the Apple II and the gorgeous iconized touch menu of the iPhone, we have grown weary with the unexpected very uncool stuff that came along with the unexpected cool stuff. Viruses, spam, identity theft, crashes: all of these were the consequences of a certain freedom built into the generative PC. As these problems grow worse, for many the promise of security is enough reason to give up that freedom.

In the arc from the Apple II to the iPhone, we learn something important about where the Internet has been, and something more important about where it is going. The PC revolution was launched with PCs that invited innovation by others. So too with the Internet. Both were generative: they were designed to accept any contribution that followed a basic set of rules. Both overwhelmed their respective proprietary, non-generative competitors, such as the makers of stand-alone word processors and proprietary online services like CompuServe and AOL. But the future unfolding right now is very different from this past. The future is not one of generative PCs attached to a generative network. It is instead one of sterile or contingently generative appliances tethered to a network of control. These appliances take the innovations already created by users and package them neatly and compellingly, which is good—but only if the Internet and PC can remain sufficiently central in the digital ecosystem to compete with locked-down appliances and facilitate the next round of innovations. The balance between the two spheres is precarious, and it is slipping toward the safer appliance.

If security problems worsen and fear spreads, rank-and-file users will begin preferring some form of lockdown. A software development kit for the iPhone is just being launched, intending to harness the value of contribution from outsiders while allowing control by and security through Apple: software authors will have to register, and their applications may only be made available through the Apple iPhone App Store, where Apple can control what may be installed on the phones. In turn, this sort of lockdown opens the door to new forms of regulatory surveillance and control. We have some hints of what that can look like. Enterprising law enforcement officers have been able to eavesdrop on occupants of motor vehicles equipped with the latest travel assistance systems by producing secret warrants and flicking a distant switch. They can turn a standard mobile phone into a roving microphone—whether or not it is being used for a call. As these opportunities arise in places under the rule of law—where some might welcome them—they also arise within technology-embracing authoritarian states.

We face a constitutional moment in cyberspace, not because of a watershed moment of oppression by a sovereign, but because of difficult choices of our own making: abuse of our open network and hardware by some among us, and a resulting mass movement towards – indeed, demand for – lockdown. Our future can be kept generative only if we can continue to see the Internet's invitation to be participants in its use, rather than consumers of it. The path forward is illuminated by the coupling of technological tools – like wikis – that have promoted openness, with social customs and law – like those of Wikipedia – that solicit people to take an active part in building the world they want, rather than simply paying for it and expecting others to do the rest.

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