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Radical Technologies

The Design of Everyday Life

Adam Greenfield • Verso Books © 2017 • 368 pages

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Take-Aways

- Most city dwellers can't manage their lives without their smartphones.
- Networked digital information technology mediates people's daily experiences.
- People understand little about the technological systems that shape their lives.
- In the future, everyone will connect to the "global network" 24 hours a day.
- The Internet of Things aims to connect and incorporate nearly everything on Earth.
- Devices like the virtual assistant take thoughtful decision making out of users' hands.
- A virtual assistant gives you expedient help, but providers gain your personal information.
- Universal connectivity makes people vulnerable to cyberattack.
- "Digital fabrication" with 3D printers is unlikely to change the economy in the near future.
- Bringing about change is hard, even using the most "radical technologies."

Recommendation

Innovators designed and marketed networked digital information technology, such as the omnipresent smartphone and even 3D printers, to make life better, easier and, perhaps, even more egalitarian. But, argues tech specialist Adam Greenfield, the real impact of these technologies goes further: they transform people's day-to-day life. For many people, navigating urban life without a smartphone has become impossible. Yet despite the increasing centrality of these information technologies, few people know how they work, what drives their design, who makes them or whether anyone else has access to what they do on their phones all day long. Greenfield explains the ways in which disruptive technologies leave incumbent political and economic powers intact and often serve them. To maintain individual autonomy and control, people need to know more about the "radical technologies" they embrace. Greenfield may sometimes overstate the degree to which those who create new technologies and those with access to the vast data they generate put ordinary users at risk and undermine their agency, but his scope is broad and his vision is compelling. *getAbstract* recommends his eloquent and passionate argument to entrepreneurs, business students and activists concerned with the impact of technology.

Summary

The Smartphone in Daily Life

Smartphones may be history's most swiftly and universally accepted technology, "the signature artifact of our age." They rapidly became a ubiquitous, essential high-tech accessory for daily life. People use smartphones for a variety of often unrelated activities. You can use your phone to call and text people, read and send emails, take photographs, find a restaurant or a shop, order rides, or book a place to stay. You can even open your garage door with your smartphone.

"As individuals and as societies, we desperately need to acquire a more sophisticated understanding of how technologies work in the world."

The smartphone supplanted a wide variety of physical objects: telephone booths, address books, maps, guidebooks, cameras and even money. The smartphone mediates your experience of mundane daily tasks. It is part of a worldwide movement toward "dematerialization," which makes once ordinary objects seem strange or unfamiliar. While smartphones changed the way many people lead their lives, few understand how they work.

"A series of complex technological systems shapes our experience of everyday life, in a way that simply wasn't true in any previous era, and we barely understand anything about them."

The smartphone itself depends on a complicated infrastructure of base stations, cables and microwave relays designed, manufactured and built for profit, but the public doesn't know the interests and incentives involved. Every time you use a smartphone, you generate data. The people who store that data leverage it for their own purposes.

The Internet of Everything

In the wireless world in which nearly everyone has a smartphone, the Internet absorbs virtually everything. The Internet of Things (IoT) isn't a single technology but a variety of linked devices that record and process events as they occur. These events instantly become data that network companies gather and leverage. The IoT includes devices designed to monitor your bodily functioning, creating a "quantified self." It also monitors the spaces in which people live and the cities they inhabit, creating the "smart home" and the "smart city." Wearable biometric sensors, like Fitbit and the Apple Watch, document biological data you can use to regulate your exercise. Such devices promote the quantified self, touting self-awareness based on statistics to bring the data revolution to fitness and health. You can observe the condition of your body and the progress you're making in hard numbers. The idea of the quantified self may be a harmless fixation for Silicon Valley tech geeks, but applying it to society as a whole is more problematic. Major health insurance companies have lowered premiums for users of biometric device who document enhanced, consistent levels of exercise.

"It simply isn't possible to understand the ways in which we know and use the world around us without having some sense for the way the smartphone works."

Like biometric sensors, virtual assistant devices provide forms of convenience that supplant the need for time-consuming careful thinking and considered decision making. With Amazon's Dash Button app, users can reorder ordinary household items, like soap or diapers, on the fly. You press a single command, and the company promptly ships them to your home. The busy consumer gains convenience, but the provider picks up a rich stream of copious data on the user's needs and habits, which it can analyze and reproduce as product recommendations. Companies use this data to develop models of consumer behavior they then deploy in marketing. While biometric sensors and virtual assistants give consumers modest benefits, they encourage people to avoid reflecting on how they spend their money and fulfill their needs.

The "Digital Fabrication" of Experience

Virtual reality (VR) technologies, which require head-mounted equipment, generate computer graphics that create all-encompassing experiences. By contrast, augmented reality (AR) technologies, like the popular game Pokémon GO – which you can play on a mobile device like a smartphone – provide "location specific" information about objects in the visual field. Rather than creating an experience in a wholly alternative world, Pokémon GO transforms existing reality without the need for any special equipment.

"Many...things city dwellers once relied upon to manage everyday life...have now been subsumed by a single object: the mobile phone."

Other forms of AR are less whimsical and more useful: They can provide directions or replace guidebooks by supplying information about the history of a particular landmark, like a building or a battlefield. This brings the vast store of information available on the global network to bear on the objects and places of day-to-day life, whether the user is on vacation, taking a walk or going to work. AR fundamentally augments people's senses and minds.

“As the smartphone has come to stand between us and an ever greater swath of things we do in everyday life, the global trend toward dematerialization is unmistakable.”

Augmented reality delivered via smartphone is inevitably limited and doesn't wholly mediate reality. To remedy this situation, companies developed “wearable mediators,” mostly headsets such as the poorly received Google Glass. A wearable AR device displays the “informational overlay” that users are familiar with from the smartphone directly in front of their eyes.

“For all the hype around bitcoin, it is clear that in its design, important questions about human interaction...are being legislated at the level of technological infrastructure.”

Apart from the usual tech challenges, wearable mediators raise other issues. If they become as central to daily life as smartphones, how long will someone be able to wear such an apparatus? People haven't yet adopted wearable mediators at the level of the smartphone, but early reports suggest users become disoriented when they remove their headset. Over time, they develop a form of “dependence”: They find it difficult to function without the device. The mass use of wearable devices might amplify narcissism, reduce the attention people pay to each other and degrade any sense of a “shared public realm.”

The Digital Fabrication of Things

In one of his final works, the great mathematician John von Neumann (1903–1957) speculated about the idea of a “universal constructor” that could literally make anything, including itself. Some 40 years later, British engineering professor Adrian Bowyer took up von Neumann's challenge and created a “desktop-scale factory,” or what he called the “replicating rapid prototyper” (the RepRap), which could manufacture its own simple, inexpensive parts. Part of the vision behind the RepRap was that it would democratize manufacturing and lower its costs, as well as substantially improving “planetary production capacity.”

“Like the smartphone, the Internet of Things isn't a single technology, but an unruly assemblage of protocols, sensing regimes, capabilities and desires.”

In the process, the RepRap's proliferation offered the possibility of eliminating scarcity. In the end, even after multiple iterations, Bowyer's utopian dreams for the RepRap didn't come to fruition, in part because of its extremely narrow capacity. It couldn't produce anything large on an industrial scale or anything subtle and complicated. Nonetheless, the RepRap inspired a new generation of 3D printers that take advantage of the steady, dramatic increase in the power of digital technologies. Today's 3D printers can produce – at low cost – unique objects that are remarkably complex in structure and design.

“The Internet of Things is the most tangible material manifestation of a desire to measure and control the world around us.”

The global proliferation of cheap, effective 3D printers would cause a revolution in what is currently understood as capitalism. It would end certain types of scarcity, but it also would change how the economy works, the structure of cities and the experience of daily life. If people commonly owned 3D printers, they could make anything whenever they need it and discard it when it's no longer useful. This would eliminate the uncertainty dynamic of resources, supply and demand from economic and social life.

“The sole genuine justification for augmented reality is the idea that information is simply there, and can be assimilated without thought or effort.”

Yet, obstacles still confront this “vision of post-scarcity utopia.” First, “digital fabricators” are unevenly distributed. They aren’t widely accessible, and the communities that run them intimidate much of the population.

The fabrication of many of the things – say a cast-iron pan, which can be made only in an induction furnace – requires facilities and skills that are difficult if not impossible to distribute widely. And the sustainability of digital fabrication faces many questions. Like traditional industrial processes, it produces substantial amounts of waste. Given all this, digital fabrication is unlikely to change the world radically any time soon.

Computational Cash and the Blockchain

Even with credit and bank cards, prior to the broad adoption of the smartphone, people needed to carry a reasonable amount of hard cash. But physical money seems increasingly archaic with the near universal adoption of the smartphone and its application to all aspects of daily life.

“Just as our bodies and homes have become comprehensively instrumented, so too has the terrain through which we move.”

Prior to 2008, innovators sought to develop a form of digital currency. The difficulty of securing such a currency’s value plagued these early efforts. A centralized “mint” and “ledger,” both vulnerable to fraud and government manipulation, secured the value of earlier forms of digital currency.

“We barely have the language to describe what politics looks like when material scarcity no longer sets fundamental bounding constraints on human possibility.”

An enigmatic inventor – or possibly group of inventors – going by the name Satoshi Nakamoto, appears to have solved this problem with the cryptocurrency called bitcoin. Each bitcoin has its own unique “cryptographic signature.” Both payer and recipient time-stamp and sign each bitcoin transaction. Each exchange goes through an algorithm that creates a unique, unchangeable “hash value” documenting the transaction, which becomes part of the ongoing blockchain of transactions. Everyone on the network gets a copy. A global network of peers manages the value of the bitcoins – all without bank or government involvement.

“Whenever we get swept up in the self-reinforcing momentum and seductive logic of some new technology, we forget to ask what else it might be doing.”

Could bitcoin transform the economy, even with the emergence of ever more complex methods of validation and more powerful technologies? This appears doubtful. For bitcoin to change the economy, its network has to operate at scale. That would require a massive increase in “aggregate processing power,” which would consume vast amounts of energy and money. Nonetheless, the advent of bitcoin and the blockchain introduced a means for the cryptographic verification of identity. This enables consensus building on a diffuse, global scale, which may have myriad other possible uses.

The Technological Future

Companies that introduce new technologies like the smartphone, AR technologies, 3D printers and bitcoins often assert that these advances will “spontaneously produce the conditions of equity, justice or freedom.” Proponents say similar things about automation, machine learning and artificial intelligence. Consumers should evaluate the potential utopian political and economic impact of these technologies independently of the designers’ purposes and interests.

“The price of connection is vulnerability, always and in every context.”

None of these technologies alone can end “scarcity, capitalism” or “oppression.” Bringing about a revolution simply with the advent of a new technology is difficult, no matter how profoundly that technology changes how people live. People widely, if not yet universally, use the smartphone, and it’s changed how people negotiate their lives. But the smartphone and its elaborate infrastructure, like other new technologies, fit neatly into existing “ways of doing, making and selling” and into traditional structures of power. While technologies like the smartphone may be helpful, society must pursue social change directly.

Networked technologies now mediate human life. “Networked processes of measurement, analysis and control” shape daily life and affect the way people get directions, find restaurants or buy groceries as well as how they learn history. This turns their environments into data that interested parties can use. Human life in all its aspects disperses across the vast and complicated infrastructure of the global network.

People who grow accustomed to this don’t ask questions about either the “institutional processes” or the interests that underlie how designers create technology or what impact these technologies will have on how humans live together. New technologies – no matter how forward thinking their designers and promoters – simply fall back on traditional politics and economics. Networked technologies can lead to different politics and economics – and ultimately to social change – only if society’s leaders first are willing and able to analyze these mechanistic factors closely.

About the Author

Adam Greenfield, also the author of *Against the Smart City*, taught in the Urban Design Program of the UCL Bartlett Faculty of the Built Environment at University College London and the Interactive Telecommunications Program at New York University. He was head of design for Nokia; an information architect in Tokyo; a rock critic for *SPIN Magazine*; a medic at the Berkeley Free Clinic; and a sergeant in the US Army’s Special Operations Command.



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