

Executive Summary

ANYTHING DONE A SECOND TIME is no longer an innovation, and therefore innovation resists planning and rational management. Consider three of the most successful American technological innovations of the past several decades: the IT revolution, the defeat of HIV/AIDS, and the shale energy revolution. Information technology has become central to contemporary economic growth; HIV/AIDS is the only instance in decades of our having defeated a major new disease on the scale of earlier triumphs over infectious diseases; and the United States has suddenly and unexpectedly moved to a position of global energy superpower. In each case federal investments, often over decades, were crucial to ultimate success. But in each case, the methods that created the breakthroughs themselves were either independent of, or actually contrary to, the dominant federal policy focus in each area.

This was in part because of the crucial role played by marginalized groups ranging from nerdy computer hobbyists to gay-rights activists. And it was in part because the solutions themselves were typically very threatening to established technology organizations, both public and private. In 1975, almost nobody in power foresaw that Bell Labs and IBM were about to be outcompeted by start-ups that didn't yet exist. In 1985, almost nobody in power foresaw the rapid, iterative method for drug development that invented the algorithmic cocktails necessary to conquer AIDS. In 2005, almost nobody in power foresaw the shale revolution, which would transform the geopolitical situation of the U.S. within a decade. And in 2016, we can be confident that almost nobody in power can currently foresee, never mind manage, whatever future technology innovation will ultimately produce the greatest benefits for America and the world.

What then should those in power do? In short, they should try to create the conditions for innovation, rather than attempting to guide the

direction of innovation. This would be in keeping with the historical American approach to achieving innovation, which at its most effective has demonstrated an almost ruthless pragmatism in implementing the core principles of free markets and strong property rights, overlaid with decisive government investments in infrastructure, human capital, and fundamental knowledge. The contemporary implementation of these principles combines four specific elements: (1) a foundation of free markets and strong property rights; (2) a swarm of entrepreneurial start-ups with independent venture financing; (3) competitive-cooperative relationships between these start-ups and large incumbent companies; and (4) support by massive government technology investments. This paradigm first emerged in the information technology industry, but has now become the foundation of more recent breakout successes in the energy and life-sciences sectors.

Policymakers should attempt to reinforce each of these four elements of American innovation leadership. Focusing on the specific and practical, several of the most attractive policy changes are the following:

1. Reallocate 5% of federal social welfare spending to double federal spending on science and technology.
2. Focus U.S. immigration policy on the recruitment of high-skill workers, rather than on family-unification and humanitarian goals.
3. Reorient energy policy around accelerating and exploiting the shale energy revolution in the medium-term, and investing in breakthrough fundamental research for alternative energy sources for the long-term.
4. Update pharmaceutical regulation by modernizing patent law and FDA approval of new therapies to reflect the new, increasingly personalized nature of therapeutic innovation.
5. Liberalize regulation of the electromagnetic-frequency spectrum to allow holders of spectrum licenses to use their assigned frequencies for any purpose from radio broadcasting to smartphone services.

The first chapter of this section is a general overview of the contemporary American innovation process set in historical context, with several resulting economy-wide recommendations. The three subsequent

Policy Reforms to Advance Innovation Policy

chapters sequentially analyze three industries central to American innovation: energy, biopharmaceuticals, and wireless telecommunications. Each of these three chapters then makes practical, sector-specific policy recommendations. In total, this section provides an agenda for federal government policies that would likely enable accelerated innovation in the United States.