



September 25, 2015, 02:30 pm

The missing link for American manufacturing

By Sridhar Kota and Justin Talbot-Zorn

If there's one proposition on which every presidential candidate—from Ben Carson to Sen. Bernie Sanders (I-Vt.)—can agree, it's that manufacturing matters. Even in the early days of the race, the 2016 contenders have already proposed a dizzyingly diverse range of policies designed to restore the sector: from **infrastructure investments** and **ending offshoring loopholes** to **cutting corporate taxes** and **reducing regulations**.

But, so far, the candidates have ignored the single most consequential question for the long-term future of American manufacturing: How we translate the steady march of scientific and technological advancement into useful new products. If presidential aspirants are really serious about restoring the manufacturing sector, they should start paying attention to innovation policy.

For a sense of why innovation policy matters right now, consider some of the technologies on which the bulk of today's economy is built: internet, semiconductors, lithium-ion batteries, and solar cells. None of these world-changing breakthroughs emerged directly from an academic lab but rather from the combined efforts of government-funded scientific researchers and private sector engineers over a time frame of years or even decades. These innovations required not only research and development (R&D) but also diligent "translational" work to connect the "R" with the "D," maturing initial research into useable technologies. For instance, once the basic scientific work behind the internet was in place, forward-thinking researchers undertook pre-competitive applied research aimed at building communications protocols and networking infrastructure to create a web that people could use. It was this type of translational work that connected the research with the development, making possible the breakthrough innovation through which you're reading this article now.

While federal investments in R&D slant toward basic science on the research "R" side of the R&D equation (think particle physics), industry investments are skewed heavily toward incremental innovation on the development or "D" side (think iPhone 6 to 6s). There's precious little translational work to connect the two sides.

Contrast this to an earlier era when Bell Labs—which created many of the technologies mentioned above—dominated the innovation ecosystem. Bell, like Germany's Fraunhofer Institutes, was notable for connecting the "R" with the "D", integrating the innovation pipeline from basic research all the way to manufacturing readiness.

What made Bell such an innovation powerhouse was a long-term orientation that enabled a focus on engineering the "next big thing" rather than just incrementally-better products that juice short-term earnings. But times have changed: Whereas Wall Street investors **held a stock** for an average of eight years during Bell's heyday in the 1960s, they recently averaged just four months. In this age of fast markets, CEOs—fearing poor quarterly earnings reports—can feel immense pressure to pull away from investments that might lead to transformational innovation only years in the future, and instead focus on the short-term sure bets—incremental product improvements like the slightly better smartphone.

Lack of investment in long-term oriented translational R&D is hurting our manufacturing competitiveness. Our trade deficits in advanced technology products shifted from a surplus in 2001 to a **deficit** of more than \$80 billion in 2013. The failure to translate basic science into societal solutions is also inhibiting our ability to develop innovations to solve the climate crisis, maintain defense readiness, and deal with other global challenges.

While it's important to identify and implement changes to tax law and corporate behavior to promote longer-term investment—as **both Hillary Clinton and Google's Larry Page** have recently attempted—there's also a quicker, more straightforward, and potentially bipartisan option available to boost translational R&D right now: Streamlining the federal government's pipeline for innovation.

Today, there are numerous federal agencies—from the National Science Foundation to the Department of Defense—focused on funding basic research to someday yield innovation that boosts American manufacturing. But these players are all striving to reach different finish lines rather than seeking to leverage each other's unique strengths and resources to achieve breakthrough innovation in line with top national priorities. Real innovation—the process whereby a promising idea or an emerging technology is transformed into a practical solution—requires a different vision: a marathon relay in which agencies and outside partners tag-team toward a common finish line, handing breakthroughs over to the agencies best suited to managing the next phase of development.

The next president should create a National Innovation Foundation (NIF) to catalyze and coordinate federal translational research activities. The idea would be to enable a whole-of-government approach to address grand challenges like storage and transmission for renewable energy or cybersecurity protection for critical infrastructure, leveraging the strengths and missions of different federal agencies and partnering with the private sector to ensure funding to connect basic research with manufacturing readiness.

This need not be expensive. A National Innovation Foundation could be formed by consolidating relevant offices at 12 or more key federal research agencies. It would ultimately be tasked with identifying the most promising basic research being

undertaken at science and technology agencies across the whole federal government and building public-private partnerships to invest in transforming that research into new job-creating and wealth-creating products and services. A National Innovation Foundation would go beyond existing models like the **Manufacturing Institutes** or the **Small Business Innovation Research** program by encompassing the entire innovation pipeline from basic research to early procurement to workforce development to even regulations and trade assistance—and spanning sectors from health to energy to national security.

The principle is simple: connect the dots of federal research to maximize taxpayers' return-on-investment from R&D spending.

An estimated **50 nations** now have national innovation foundations or agencies devoted to translating discoveries and inventions into commercially viable and socially useful results. Leaders **from Britain's David Cameron to China's Xi Jinping** have made coordinated investments in innovation a cornerstone of their economic policies.

For the country that created the “moonshot,” this kind of coordinated strategic investment should not be an alien concept. If candidates are serious about restoring manufacturing, it's time to get serious about turning science into new useful products.

Kota was the top adviser on advanced manufacturing in the Obama administration during the first term and is now the Herrick Professor of Engineering at the University of Michigan. Talbot-Zorn, former legislative director for Rep. John Conyers (D-Mich.), is a visiting scholar at the University of Michigan and a Truman National Security fellow.

The Hill 1625 K Street, NW Suite 900 Washington DC 20006 | 202-628-8500 tel | 202-628-8503 fax

The contents of this site are ©2015 Capitol Hill Publishing Corp., a subsidiary of News Communications, Inc.
