Innovation Policy, Structural Inequality, and COVID-19

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Abstract: COVID-19 has shown the world that public policies tend to benefit the most privileged among us, and innovation policy is no exception. While the US government's approach to innovation—research funding and patent policies and programs that value scientists' and private sector freedoms—has been copied around the world due to its apparent success, I argue that it has hurt poor and marginalized communities. It has limited our understanding of health disparities and how to address them, and hampered access to essential technologies due to both lack of coordination and high cost. Fair and equal treatment of vulnerable citizens requires sensitive and dedicated policies that attend explicitly to the fact that the benefits of innovation do not simply trickle down.

Keywords: coronavirus, covid, diagnostic testing, health disparities, innovation policy, patent, structural inequality

For decades, governments across the world have tended to ignore, and sometimes even punish, poor and marginalized communities. Public policies have attended instead to the needs of our societies' most privileged members. The COVID-19 pandemic has revealed these biases, and taught us their price. Limiting access to healthcare, allowing environmental pollution, and enabling crowded and unsanitary housing conditions is unjust, and it has made vulnerable citizens more susceptible to getting and dying from COVID-19 (Gostin and Friedman 2020). This then puts the world at risk of a highly infectious disease. And it jeopardizes our social and economic systems, as the world relies on these individuals to do essential work stocking our groceries, delivering our packages, and farming and processing our food, not to mention working in our hospitals.

The pandemic has even exposed how the public policies that seem the most objective maintain and reinforce inequalities. In this short article, I focus on how the pandemic casts innovation policies – designed to encourage scientific research and technological development for the public good – in a new, problematic light. Some might assume that such policies might be immune from bias because they are uniquely evidence-based

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and shaped by technical experts (Guston 2000). But I reveal the assumptions and values that guide them and offer suggestions for how they might be remade more equitably. I focus on the United States, but many aspects of US innovation policy have been adopted around the world.

The priorities of scientists and the private sector famously drive the US innovation policy infrastructure, which includes the programs dispensing research funding, encouraging technological development, and issuing patents, and their associated rules and laws (Kleinman 1995; Sarewitz 1996). Vannevar Bush, Director of the Office of Scientific Research and Development that led the Manhattan Project, envisioned this approach in his blueprint for US science policy, *Science: The Endless Frontier.* Written in 1945, Bush's report rejected the Manhattan Project's mission-driven approach and instead argued that unfettered scientific inquiry would produce greater societal benefit. He noted:

> The Government is peculiarly fitted to perform certain functions, such as the coordination and support of broad programs on problems of great national importance. But we must proceed with caution in carrying over the methods which work in wartime to the very different conditions of peace. We must remove the rigid controls which we have had to impose, and recover freedom of inquiry and that healthy competitive scientific spirit so necessary for expansion of the frontiers of scientific knowledge. (Bush 1945)

Government leaders followed Bush's advice when establishing the National Science Foundation in 1950 and in expanding the National Institutes of Health (NIH), which funds biomedical research. Then and today, the scientific community guides these agencies' research priorities and determines the types of university research projects that should receive government support. An innovation system shaped by scientists, the logic goes, will generate more knowledge about the world and build a skilled workforce (Sarewitz 1996).

The private sector then capitalizes on the results of this scientific curiosity to develop socially beneficial technologies, which are made available in the marketplace. Key to this is the modern patent system: the government incentivizes inventors by providing them with patent rights, to commercialize and profit from their new technologies exclusively and for a limited period of time (Parthasarathy 2017). The US Congress reinforced the links among government funding, university science, and the marketplace with the 1980 Bayh-Dole Act, which allowed universities to retain the rights to patents on inventions created through government-funded research (Popp Berman 2012). The more inventions were patented and made available to the private sector, the logic went, the

more technology would be available to the public. Today, increasingly cash-strapped universities encourage their researchers to patent inventions, and license these patents to private companies who will develop and commercialize them (Kleinman 2003). As a result, there has been a sharp rise in US patents granted, and high-tech industries have blossomed. And countries across the world have adopted these innovation policies, seeking to replicate the US approach (Siepmann 2004).

But the COVID-19 crisis has shown us that these innovation policies do not serve citizens equally, in at least three ways:

(1) *Minimal Funding for Health Disparities Research.* The US approach to research funding has left us unprepared for and unable to manage the disproportionate health impacts of the virus among people of color, especially Black communities. The NIH, the world's largest public funder of biomedical research, devotes little money to this subject. One analysis found that it spends 500 times more on genetics research as on structural racism and its impacts on health (Krieger 2005). This is not surprising in a system where scientists drive funding priorities, and where investigators from historically disadvantaged minority groups struggle to receive funding. The needs and concerns of disadvantaged minorities may seem less important or urgent to most scientists (Shavers et al. 2005). But this scarcity has left us without the evidence to understand why communities of color are disproportionately suffering and dying from COVID-19, or what steps to take to address this imbalance.

(2) *Uncoordinated Research and Development Creates Uneven Access to Diagnostic Testing.* Absent the "rigid controls" that Bush dismissed, the US innovation system is highly decentralized and market-driven. So, diagnostic testing for SARS-CoV-2 (the virus that causes COVID-19) has been essentially impossible to coordinate. Traditionally, the Centers for Disease Control and Prevention and public laboratories funded by state and local governments lead infectious disease surveillance, but they have limited capacity (Crawford et al. 2010). The COVID-19 pandemic created demand that far outstripped what these laboratories could provide, but there was no systematic way to expand capacity. A variety of laboratories, including at universities, stepped up, but it remains difficult to connect supply and demand (Maxmen 2020). Different electronic records platforms cannot communicate. Some hospitals have exclusive partnerships with big commercial laboratories. And, even as testing has become more available, white and higher income communities gain access more easily (McMinn et al. 2020).

By contrast, South Korea has been widely praised for its SAR-CoV-2 testing strategy (Thompson 2020). Three weeks after the Chinese government shared the virus's genome sequence on January 12, the South

Korean government approved multiple diagnostic tests developed by its biotechnology sector (The Government of the Republic of Korea 2020). The country's National Health Insurance Corporation purchased and distributed them. Ultimately, testing was plentiful and widespread, and the government implemented a companion contact-tracing program that minimized the number of COVID-19 cases and deaths.

Certainly, South Korea has learned from its experiences with previous coronaviruses, and benefits from a nationally coordinated healthcare system. But the rapid and straightforward development and distribution of diagnostic testing is also the result of a different approach to innovation policy than what the United States has taken up. Since the 1960s, South Korea's government has played a major role in shaping research and development including in the industrial sector, by building capacity and setting priorities (Yim and Kim 2005). Government and industry have close professional ties and a sense of shared goals. In the years before COVID-19, for example, the South Korean government funded multiple companies developing viral diagnostic testing (The Government of the Republic of Korea 2020). With these relationships, technologies, and coordination with the healthcare system established, the government was able to immediately ask the private sector to develop SARS-CoV-2 tests. Three of the first five companies to receive emergency regulatory approval had received government funding for their diagnostics research. This proactive capacity building ensured that there was no need to ration testing, and therefore no inequality in access.

(3) *Patent Policies Limit Access to Essential Technologies.* While patents provide an incentive to innovate, the exclusive rights of commercialization they carry can make the most valuable technologies the most expensive. There is growing concern that COVID-19 treatments and vaccines will be priced out of reach for many, despite their importance for public health and economic recovery. Consider the case of remdesivir, a promising COVID-19 treatment developed with the help of US government and university scientists but which biotechnology company Gilead Sciences has patented and commercialized (Ardizzone 2020). Gilead has a long history of charging high prices for its patented drugs, including hepatitis C drug Sovaldi which costs $84,000 for a 12-week course of treatment (Senior 2014). The company must now balance pressure from its investors against its interpretation of civic duty as it determines pricing for this promising COVID-19 drug.

In the United States, pricing decisions are left up to patent holders like Gilead, with the assumption that their decisions will ultimately benefit society (Parthasarathy 2017). But many European, Latin American, and Asian countries have standard compulsory licensing laws, which allow

governments to step in and require patent holders to license their inventions in the public interest so they can be produced and sold by others ('t Hoen 2016). Some have also established patenting standards that make it harder to establish complete monopolies over important technologies like medicines. In the case of COVID-19, Canada, Germany, Chile, and Ecuador have also already amended their patent laws to ensure rapid compulsory licensing of any tests, treatments, or vaccines if necessary ('t Hoen 2020). Policies like these ensure market competition and, ultimately, lower prices and greater accessibility.

For decades, governments have assumed that the best way to develop innovation in the public interest is by protecting the freedoms of scientists and the private sector. But COVID-19 has shown us clearly how this approach ignores the needs and realities of the most poor and marginalized among us, disenfranchising them. As the world's leaders reckon with the inequities and injustices revealed by the pandemic, they must recognize that fair and equal treatment of these vulnerable communities requires sensitive, dedicated, and well-coordinated policies that attend explicitly to the fact that the benefits of innovation do not simply trickle down.

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