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Five Bold Steps Toward a Reimagined American Innovation Agenda

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There is a growing sense something is amiss with the U.S. innovation system. It's time for a vigorous initiative to restore belief in innovation's potential as a force for social and economic progress, for the benefit of America and the world.

KEY TAKEAWAYS

- The first step is telling the story: reclaiming a positive narrative about innovation, contextualized as "creating an inclusive innovation economy that works for all Americans."
- The second step is stewardship: defining authorities and responsibilities by convening a representative set of stakeholders to craft the outlines of a high-level agenda, recognizing it will have many owners, executors, and benefactors.
- The third step is to produce a coherent national strategy with a "whole-of-society" perspective. A wide range of players and stakeholders must be able to contribute, and an equally diverse milieu of stakeholders must benefit.
- Fourth, if it is going to be meaningful, impactful, and benefit all Americans, a renewed U.S. innovation strategy must be scalable and broadly accessible.
- Finally, a reimagined U.S. innovation system must maximize the three most importance sources of capital: human talent, intellectual capital, and financial capital.

INTRODUCTION

Innovation is as American as apple pie. From the cotton gin and airplane of yesteryear to the semiconductors, Internet, and cancer immunotherapy of today, U.S. contributions to the human history of innovation can proudly go toe-to-toe with those of any nation in the world. But there's a growing sense that something is amiss with the U.S. innovation system. Breakthroughs still come, but at a slower rate; the economic benefits from innovation are increasingly unevenly distributed and largely concentrated to populations on the coasts; the country slowly slides down various indices of international competitiveness and innovation, faltering in areas from federal investment in research and development (R&D) to students' math and science scores.

America needs to embrace five bold steps—story, stewardship, strategy, scaling, and system—as part of an effort to reimagine a renewed American innovation agenda for the decade ahead.

Pervading all this is a fear (real, if unfounded), amidst a global pandemic no less, that perhaps the technologies that are being developed—such as artificial intelligence (AI) and automation—may ultimately cost more jobs than they create. In short, the historical American belief in technology and innovation as a force for progress is today questioned at levels unprecedented in U.S. history. As such, it's time for a vigorous initiative to restore innovation's potential as a force for social and economic progress, for the benefit of America and the world. As this report and infographic (figure 1) elaborate, America needs to embrace five bold steps—story, stewardship, strategy, scaling, and system—as part of an effort to reimagine a renewed American innovation agenda for the decade ahead.

STEP ONE: RECLAIM A POSITIVE NARRATIVE

The first step needs to be reclaiming a positive narrative pertaining to innovation, perhaps contextualized as "creating an inclusive innovation economy that works for all Americans." That matters, especially when a recent study by the Information Technology and Innovation Foundation (ITIF) and the Brookings Institution found that fully one-third of the nation's innovation jobs now reside in just 16 U.S. counties, and more than half are concentrated in 41 counties.[1] With that sort of concentration, no wonder it's been difficult to build a shared national narrative on why innovation matters to our society as a whole.

Thus, a **story** is needed that connects with citizens from all walks of society, creates alignment among diverse constituencies, explains the "why" of innovation, generates a sense of urgency toward a shared national purpose, and reflects the fulfillment of shared national values. But a story cannot be fluff—especially in Washington, D.C., where an obsession with "spin" and "narrative" all too often conflates meaningless sound bites with little true action or change. Rather, it must feature clear aspirational goals animating society toward a shared purpose that delivers meaningful benefit for all. President John Kennedy's moonshot—a Cold War initiative to show leadership over the Soviets—is commonly, and rightly, referenced as a catalytic aspirational goal that set America to a great purpose larger than itself. Perhaps something similar is needed today, whether with regard to curing a disease, substantially eradicating poverty, or making measurable progress toward climate change. To be sure, such an aspirational goal—or even two or three—wouldn't in itself represent the be-all and end-all of a renewed American innovation

agenda. But it could be the rubric and fabric under which a multitude of efforts, programs, and investments proceed. For instance, perhaps the most-lasting impact of the moonshot wasn't the space program or even going to the moon itself, but rather the massive federal R&D funding and training of a generation of scientists and engineers who would go on to start thousands of companies and develop the technologies that seeded a digital revolution that transformed the global economy and society.

STEP TWO: EMPOWER STAKEHOLDERS TO TAKE OWNERSHIP

Whether it pertains to a business, government agency, university, or even the individual, to succeed at innovation requires individual and institutional ownership of the responsibility to innovate. In other words, successful innovation requires **stewardship**. If no one accepts responsibility for innovation, it's not going to happen. Conversely, while all Americans hold the capacity to, and indeed should, contribute to innovation, it's daft to simply say innovation is everyone's responsibility; for then again innovation would fall prey to the free-rider problem, and there would be little structure to harvest, organize, and scale the nation's latent innovation potential.

A number of different stewardship models are competing in the world economy today, from China's brand of state-led capitalism to Europe's more social-democratic approach to the more free-market approach seen in Anglo-Saxon nations such as Britain and the United States. The point here is that while some nations have embraced a government-directed approach toward innovation/economic growth—think China's five-year plans and recent "Made in China 2025" strategy—the United States has favored a more public-private partnership-based innovation model. A variety of actors can be found within the U.S. government alone, including (to name a few) 17 National Laboratories, the National Science Foundation and its I-Corps program, the Defense Advanced Research Projects Agency (DARPA) at the Department of Defense, and a wealth of programs at the Department of Commerce, such as the National Institute of Standards and Technology (NIST), the Manufacturing USA Network, and the Manufacturing Extension Partnership (MEP) program. This array of federal programs is complemented by a plethora of initiatives in state governments; and of course there's an overlay of innovation efforts going on within U.S. companies, universities, and research institutions.

In other words, all the ingredients are present, but somehow it feels like the potential for U.S. innovation remains less than the sum of its parts. What's therefore needed is an effective stewardship process that defines authorities and responsibilities, with the goal of building, and executing, an innovation agenda—leveraging input from a variety of public-private stakeholders, including representatives from government and academia to enterprises, civil society, and non-governmental organizations. The goal here is not to build a top-down bureaucratic body, but to convene a representative and diverse set of stakeholders that can craft the outlines of a high-level agenda, recognizing it will have many owners, executors, and benefactors.

STEP THREE: DEVELOP A COHERENT NATIONAL STRATEGY

This stewardship process should produce a coherent national innovation **strategy**. As John Kao wrote in *Innovation Nation* and ITIF wrote in *Innovation Economics*, at least five-dozen nations around the world operate formal national innovation foundations that regularly produce national innovation strategies.[2] In fact, ITIF and Brookings have long argued that America needs to stand

up a National Innovation Foundation alongside the National Science Foundation as that steward of innovation (and technology commercialization).[3] But, leaving aside this federal institutional issue, it was actually not until Obama that a U.S. presidential administration released the first formal Strategy for American Innovation in the country's history.[4] This should become a standard practice for all administrations, with continuous integration enabled by the processes described herein. A national innovation strategy constitutes a coherent approach that seeks to coordinate disparate policies toward scientific research, technology commercialization, information and communications technology (ICT) investments, education and skills development, tax, trade, intellectual property (IP), government procurement, and regulatory policies in an integrated fashion that in turn drives economic (and employment) growth by fostering innovation. As Finland's National Innovation Strategy contends, it's vital that nations' innovation strategies comprehensively address a broad set of policy issues because "piecemeal policy measures will not suffice in ensuring a nation's pioneering position in innovation activity, and thus growth in national productivity and competitive ability."[5]

It's time for a vigorous initiative to restore innovation's potential as a force for social and economic progress, for the benefit of America and the world.

Regarding the U.S. context, our innovation strategy should include a prioritization of efforts focused on tackling "wicked problems" such as climate change and health challenges from the coronavirus to cancer to aging, and helping our enterprises and workforce learn and adopt the technologies and skills (many digital) they'll need to survive in fierce global economic competition. It should consider how to bolster U.S. competitiveness in key industries essential to America's economy, such as aerospace, biotech, semiconductors, industrial manufacturing, and the Internet economy. And it should ensure that the U.S. military maintains its technology lead over its adversaries.

The innovation strategy should also be attuned to making progress on innovation in these areas over at least three time horizons: immediate, medium, and long-term. The innovation strategy should embody a "whole-of-society" perspective, contemplating both the contributions a range of players and stakeholders could make to it as well as an equally diverse milieu of stakeholders that would be beneficiaries of the innovation strategy. Such a national innovation strategy would clearly define elements such as specific social, economic, and industrial goals; "whole of society" owners and stakeholders; processes; programs; investments; mechanisms; and an appropriate system of metrics to evaluate progress toward these goals.

STEP FOUR: MAKE IT SCALABLE

If it is going to be meaningful, impactful, and benefit all Americans, a renewed U.S. innovation strategy needs to be able to **scale** and be broadly accessible nationally. For instance, consider that just four U.S. states command over 80 percent of all U.S. venture capital (VC) investment. Efforts must be made to ensure that federal investment, and private risk capital, are widely available nationally.[6] For instance, the State Small Business Credit Initiative (SSBCI), introduced in the wake of the Great Recession, created a $1.5 billion fund designed to strengthen state programs that support lending to small businesses and small manufacturers.[7] The bipartisan New Business Preservation Act would follow up on SSBCI by incentivizing VC formation around the

country by allocating $2 billion to states under the "Innovation and Startups Equity Investment Program" to match state-level VC investments in promising firms.[8] These programs are encouraging, but policymakers can and should be thinking much bigger. The Endless Frontiers Act, bipartisan legislation introduced in Congress this past summer by Senators Schumer (D-NY) and Young (R-IN), calls for $100 billion of investment in federal R&D and innovation programs over the next five years.[9] One component of the legislation features $10 billion to establish innovation hubs in up-and-coming tech centers (e.g., in Nashville, Pittsburgh, Rochester, etc.) across the country to bolster regional innovation capacity.[10] Elsewhere, congressional legislation embodied in the CHIPS for America Act would help secure American leadership in the next generation of semiconductor technologies.

For his part, President Joe Biden has called for $300 billion in investment over the next four years in America's science, technology, and R&D enterprises, particularly for breakthrough technologies. This can build upon the Trump administration's expanded investments in federal R&D for what it identified as the five key industries of the future: AI, quantum computing/quantum information sciences, advanced communication networks including 5G, advanced manufacturing, and biotechnology. Indeed, a key priority of the executive branch of the U.S. government must be to restore faltering federal investment in R&D, which, as a share of gross domestic product (GDP) is at 0.62 percent today, has fallen to the lowest level since 1955—that's *pre-Sputnik* levels.[11] The federal government needs to be investing at least $100 billion more annually in R&D and innovation support programs—and in so doing would provide the financing to fund many of the initiatives and programs that would be part of a renewed national innovation agenda. One reason this issue is so important is federal investment in R&D represents an intergenerational compact. The investments we make today represent the seed corn of the technologies that will provide the foundation for the occupations and industries of tomorrow. Multiple older generations of Americans have been willing to make sacrifices for a better shared future, but our current generation has fallen short in this regard.

STEP FIVE: MAXIMIZE HUMAN, INTELLECTUAL, AND FINANCIAL CAPITAL

This speaks to the final element of the agenda, the broader **system** (referred to as "sourcing" in the infographic in figure 1) for the kinds of inputs that are necessary to fuel innovation at scale. Specifically, nations need to maximize three kinds of capital: human talent, intellectual capital, and financial capital. In the modern knowledge-, technology-, and ideas-driven economy, there is probably no more sustainable source of national competitive advantage than the education of a country's citizenry and the skill set of its workforce. And here, the United States is starting to falter badly. Fifteen percent of U.S. students aren't making it out of U.S. high schools; real educational attainment outcomes for students at four-year U.S. universities are increasingly dubious; and the United States invests just one-sixth the Organization for Economic Cooperation and Development (OECD) average in workforce training programs.[12] And while attracting foreign-born talent has certainly been a great strength of the American innovation system, it's quite concerning that America hasn't tended to its own STEM (science, technology, engineering, and mathematics) pipeline, with 81 percent of full-time graduate students in U.S. electrical engineering programs, and 79 percent in computer science, being international students.[13]

As part of its renewed innovation agenda, the United States needs to introduce a National Innovation Education Act, building upon the National Defense Education Act of yesteryear, to

educate the next generation of American scientists and engineers.[14] At the same time, it's important to recognize that innovation has both a technological *and* non-technological nature. Therefore, much more needs to be done in terms of training American citizens—at high schools and universities, at companies and in government agencies—about the techniques of innovation and entrepreneurship, because the tools and techniques available today, from design thinking to the business model/proposition canvas, make innovation accessible to all. Here, a wealth of opportunity exists to reimagine approaches to credentialing, workforce apprenticeships, and retraining efforts.[15]

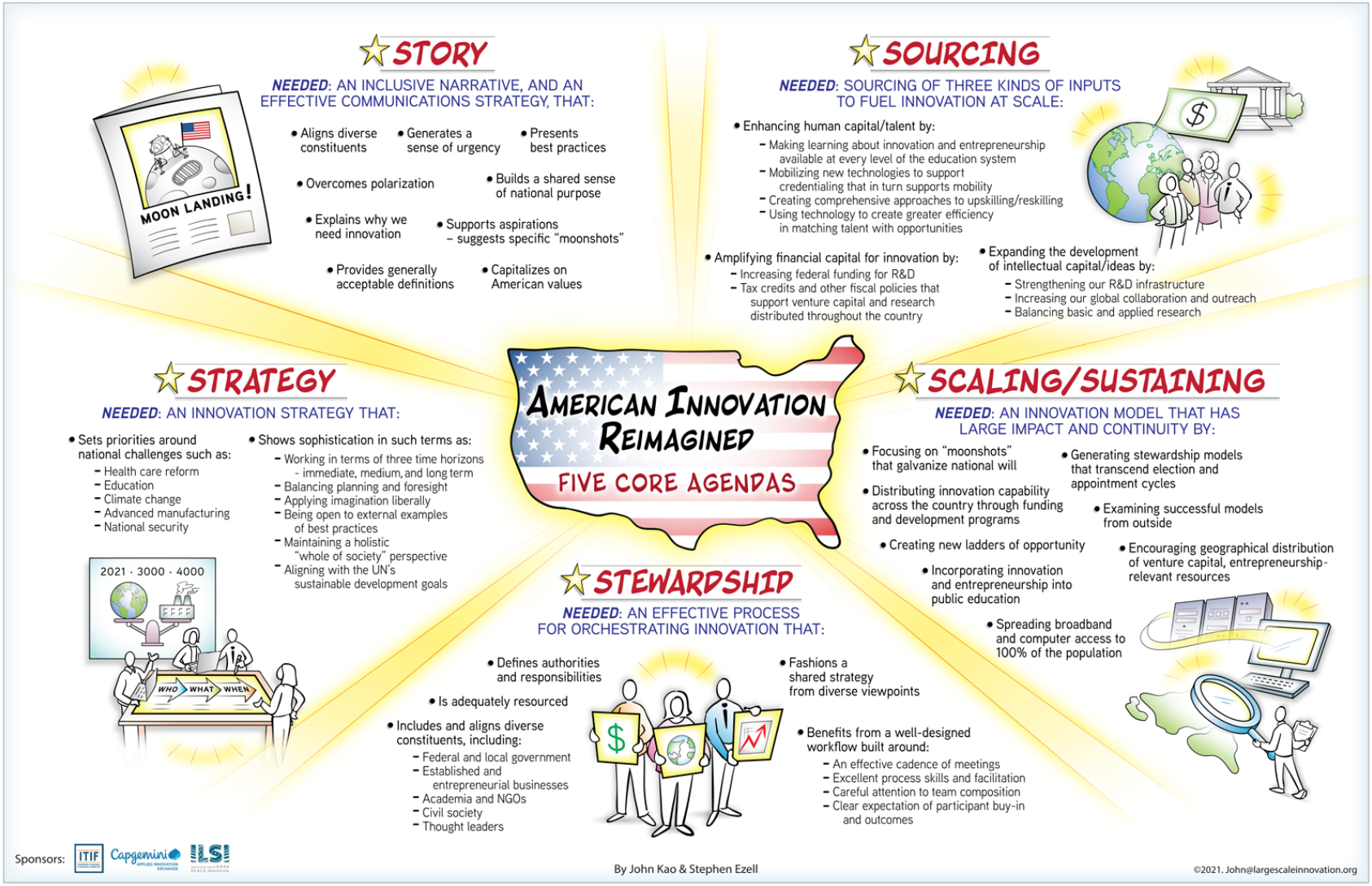
Other elements of the **system** include the regulatory, tax, and IP environment in which innovation unfolds at a national level. For instance, whereas the United States introduced the R&D tax credit instrument in 1981, and for years offered the world's most-generous R&D tax credit, the United States has since fallen to 34th among the 39 OECD nations in R&D tax credit generosity.[16] Without delving into the contentious lacunae of IP policy, it's plainly difficult to achieve innovation without the protection of ideas—and a real genius of the American innovation system has been to balance rights of innovators to profit for a limited period of time from their discoveries while disclosing that knowledge to society as a platform for innovation. Equally, America has benefitted from a regulatory approach that has generally been more prone to adopt the innovation principle than the precautionary principle (as in Europe), essentially meaning the onus is on regulators to show certain new technologies or business models are damaging to the interests of society.[17]

When it comes to innovation, Americans have come to see U.S. leadership—as in many other areas—as a birthright, as a matter of natural course. But this fails to recognize, first, that U.S. innovation leadership has historically been a product of intentional effort and investment, and, second, that an increasing number of nations are both hungry to assume the leadership mantle and willing to put in the effort necessary to do so.

But it's not just a matter of which nation "leads." Too much of our national discourse—reflected both in Trump's "Make America Great Again" slogan and Biden's considerable emphasis on "Buy American" approaches in his manufacturing platform—is populist in thinking and inward looking. America is unique in that it's one of the few nations that not only has the capacity—and in fact the responsibility—to articulate a national innovation strategy that both addresses the imperative of enhancing American competitiveness and creating high-value, high-wage employment opportunities but also contemplates how it can contribute to the global good by tackling commonly shared wicked challenges such as pandemics, climate change, poverty, etc. The brilliance of the moonshot was that it set America to a larger purpose that benefited both itself and humankind. That's the kind of thinking we need from America's next generation of leaders—and in a renewed approach to updating America's national innovation strategy for the decade ahead.

REIMAGINING AMERICAN INNOVATION—AT A GLANCE

Figure 1: Five core agendas for reimagining American innovation



APPENDIX: ABOUT THE REIMAGINING AMERICAN INNOVATION PROJECT

Innovation looms larger than ever as an anodyne to the massive social and economic dislocations we are experiencing in this era of the pandemic and the rise of social activism. Momentum is gathering for a holistic view of America's national innovation agenda that will regenerate the wellsprings of our traditional innovation prowess. Recent initiatives such as the Endless Frontier Act and President Biden's Innovate in America plan are major steps in this direction.

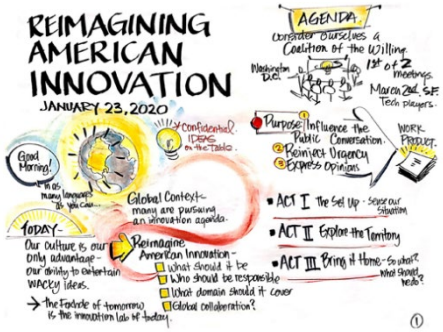
At the same time, innovation narratives at the national level often suffer from the same issues as corporate innovation initiatives: legacy thinking, elitism, lack of an effective stewardship model, narrow technocratic definitions of innovation, and more.

Reimagining American Innovation (RAI) started as a voluntary, citizen-driven process catalyzed by three organizations:

- The Institute for Large Scale Innovation (ILSI), which has pioneered approaches to large-scale, societally based approaches to innovation.[18]
- The Information Technology and Innovation Foundation (ITIF), which has provided essential perspective and intellectual capital in such areas as comparative innovation, technology policy, and intellectual property protection.[19]
- The Applied Innovation Exchange of Capgemini, which is a global network of innovation hubs that are driving new models of sustainable innovation.[20]

The purpose of RAI has been to bring the best thinking to the table as a way to enrich the conversations that are currently going on in the halls of government. As W. Edmunds Deming noted, "A system cannot understand itself. The transformation requires a view from outside." Our intention has been to contribute to that wider perspective.

We began in January 2020 with a non-partisan, deep-dive workshop in Washington, D.C., hosting a distinguished group of thought leaders as well as congressional staff and stakeholders from government agencies, nongovernmental organizations (NGOs), and the private sector. Chatham House rules were observed, with the assurance of anonymity guaranteeing candor in our discussions.



Subsequently, we carried out two virtual deep dives in July 2020, owing to the limitations imposed by the COVID-19 pandemic. We utilized best available practices for virtual meetings including videoconferencing, digital whiteboards, and Post-it note pinboards, as well as graphic facilitation.

All told, RAI has engaged some 60 distinguished volunteers in this process. Guiding questions that activated a series of lively discussions include:

- What national strategy and action steps would best serve our national interests?

- What are the biggest obstacles to maintaining America's innovation preeminence?
- What are the consequences of falling behind?
- How has COVID-19 affected our innovation agenda? What strengths and weaknesses has the pandemic revealed in our national innovation capability? What have we learned from it?
- What is the best stewardship model for the national innovation agenda?

This report and the accompanying infographic sprang from that effort. Further materials from the RAI process may be found at johnkao.com.[21]

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John Kao is chairman of ILSI. He is a leading authority on innovation, business creativity, organizational transformation, and emerging technologies who has been dubbed "Mr. Creativity" and "a serial innovator" by *The Economist*. John has been a trusted advisor to senior leaders of both public and private sector organizations; he has advised numerous countries including Finland and Singapore on their innovation strategies as well as leading firms such as Nike, Intel, and BASF. He is the author of the best-selling book *Innovation Nation and Jamming: The Art and Discipline of Business Creativity*. Dr. Kao has a BA from Yale College, an MD from Yale Medical School, and an MBA from Harvard Business School. He taught at the Harvard Business School from 1982 to 1996, specializing in innovation and entrepreneurship.

About ITIF

The Information Technology and Innovation Foundation (ITIF) is a nonprofit, nonpartisan research and educational institute focusing on the intersection of technological innovation and public policy. Recognized as the world's leading science and technology think tank, ITIF's mission is to formulate and promote policy solutions that accelerate innovation and boost productivity to spur growth, opportunity, and progress.

For more information, visit us at www.itif.org.

About ILSI

The Institute for Large Scale Innovation (ILSI) is a pioneering organization formed around a stewardship responsibility for global innovation. Its mission is to contribute to an innovation agenda that benefits global civil society. We see ourselves as innovation activists engaged in developing and mobilizing innovation capacity for the common good. ILSI is organized around four core themes: Community, Innovation Learning, an International Reference Center, and Stewardship.

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