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A National Office for Strategic Foresight Anchored in Critical Science and Technologies

A Proposal Developed for the Technology and Public Policy Project[1]

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Summary

Despite an abundance of technical experts across its agencies, the federal government lacks a centralized office charged with long-range, comprehensive, streamlined planning to address critical science and technology developments. The status quo risks misalignment between agencies and redundant strategic work. At the outset of the next presidential term, the President should create a new, centralized office championing strategic foresight. This will involve leadership in strategic processes using data-driven models to analyze plausible futures, continually evaluating macro sources of change, finding emerging trends, and mapping the trajectory and velocity of changes. Focused on providing authoritative, unbiased insights to the executive branch, it should facilitate forward-leaning research, knowledge dissemination and capabilities building via ongoing strategic conversations, experiential learning, and rigorous quantitative and qualitative proceedings that result in concrete actions.

The Challenge

In AI, genomics, autonomous transportation, home automation, and biometric data collection, technological developments have important societal implications that reach beyond the existing mandate of science and technology agencies. The U.S. government has no blueprint for long-term research and funding targets at a critical time in the developmental cycles of key emerging science and technologies.

[1] Disclaimer: The views and opinions expressed in this paper are solely those of the author and do not necessarily reflect those of Stanford University, the Geopolitics, Technology and Governance Program, or the Technology and Public Policy Project.

For example, there are numerous initiatives, offices and centers now working independently on the future of AI. Yet, interagency collaboration on these efforts is inadequate, as are any coordinated efforts to streamline goals, outcomes and funding. Efforts at the National Institute of Standards and Technology (NIST), as well as several efforts being undertaken by various congressional offices, are attempting to define technical specifications for AI, while efforts at the Joint AI Center and National Security Commission on AI are each focused on national security and defense. On AI planning, the process for the National Artificial Intelligence Research and Development Strategic Plan is duplicative of the National Security Strategy and National Security Commission on AI. Top tech executives are often asked to serve on multiple commissions or to engage in similar efforts across government. These groups and agencies working either redundantly or even at odds with each other impedes forward progress within a reasonable timeframe. The United States will miss strategic opportunities to coordinate efforts between tech, finance and government.

In the absence of a central strategic foresight office, there will be insufficient norms, standards and regulations. Worse, we will have squandered opportunities to leverage science and technology to spur economic development, to prepare our future workforce, to augment our national security, and to promote civic well-being. The following executive branch science and technology coordination mechanisms are inadequate to meet the scope of the strategic forecasting challenge lacking the mandate, scope, and/or expertise to coordinate the necessary cross-cutting approach capable of meeting these emerging challenges:

A. ***White House Office of Science and Technology Policy (OSTP)***: Charged with advising the President on science and technology issues and leading interagency policy coordination efforts, OSTP can tap deep technical expertise and has the institutional mandate to lead federal science and technology agencies in strategic planning processes. However, OSTP is not organized for a strategic forecasting role and lacks the authority to articulate future budget targets – a role that falls to the Office of Management and Budget (OMB). Nonetheless, OSTP leads strategic planning processes through the National Science and Technology Council, a coordinating entity for science and technology policy across federal R&D agencies. Together these entities are responsible for the following:

   - Undertaking domain-specific strategic planning, such as the recently updated National Artificial Intelligence R&D Strategic Plan.[i]
   - Overseeing national coordinating offices responsible for cross-agency initiatives such as the National Information Technology R&D (NITRD) Program and the National Nanotechnology Initiative. For example, NITRD is the nation's primary coordinating mechanism for federally funded research and development (R&D) at 21 federal member agencies for advanced information technologies (IT) in computing, networking, and software. However, NITRD does not conduct strategic forecasting functions, such as modeling the next-order implications.

B. ***National Security Council "Stratplan" team:*** The White House's body for coordinating national security-related strategic planning on a wide range of issues, including emerging technologies.

C. ***President's Council of Advisors on Science and Technology:*** A formal advisory group chartered to provide the President with advice on a broad range of science and technology issues. Lacking formal implementation authority, the Council nonetheless can elevate critical issues and propose federal strategies for addressing them.

D. ***Science and Technology Policy Institute***: OSTP's think tank, an independent, Federally-Funded Research and Development Center (FFRDC), receives annual appropriations from Congress to inform OSTP policy decisions – a function that is dramatically underutilized.

E. ***Government Accountability Office (GAO)***: Having recently reorganized and strengthened its science and technology and forecasting functions, GAO may be a source of strategic expertise on emerging technologies, yet the organization's mandate is to leverage its expertise in an oversight role – rather than a strategic one.

While the above entities each marshal some aspect of a strategic foresight function, there is no entity charged to focus on strategic foresight across domains equipped with the resources to undertake a comprehensive approach at a critical juncture in the emergence of a range of new platform technologies.

The Proposal

Regardless of who occupies the Oval Office in 2021 and beyond, they should champion a foresight process that positions our leaders to plan for the long-term future. A new Strategic Foresight Office (SFO) will enable leaders to articulate and realize preferred futures in which the United States remains a powerful global force. The SFO would exist as an office within the OSTP that empowers the National Science and Technology Council to convene and coordinate implementation with a dotted line to the President. This structure would mimic that of the Office of the Chief Technology Officer created by President Barack Obama in 2009 as part of an effort to elevate the importance of technology, data, and innovation in policymaking. The head of the SFO would report to directly to the President and serve as an Assistant to the President. The SFO would be staffed by individuals with strategic forecasting expertise and varied backgrounds in emerging science and technology issues. These staff members would be brought on from other agencies or institutions through details and Intergovernmental Personnel Act (IPA) arrangements.

The SFO's responsibilities should be educational, strategic and tactical. It would gather administration officials, department heads, members of Congress and other stakeholders regularly to facilitate strategic conversations, prototype policy, and model impact scenarios for the future. It would further build a culture of foresight in the federal government to inform the long-term vision for our country.

The SFO would allow for a dedicated team of individuals to think exclusively about long-term science and technology issues of national importance and their broader implications. While OSTP staff members oversee policy topics of interest to the SFO, they do not always take the same long-term strategic perspective, in part because of intense competing demands on their limited time. The SFO would provide a set of individuals and resources for long-term planning and strategic thought often absent in policy discussions due to bandwidth.

To ensure that this office has teeth, SFO would be responsible for the following:

- **Report to President**: The head of the SFO would co-chair the NSTC with the OSTP Director, and serve an Assistant to the President, responsible for providing strategic advice on a full range of science and technology topics.

- **Budget Authority**: The SFO would create an emerging technologies budget crosscut in the President's annual Budget, and articulate a series of forward-looking anticipated budget requests extending five to ten years in the future.

- **Strategic Planning**: The SFO would use a standardized, rigorous, data-driven foresight methodology and would work through the NSTC's committee structure to engage relevant agencies on strategic planning and drive execution with accountability.

- **Cross-Agency Priority Goals**: The SFO would work with OMB to establish a suite of Cross-Agency Priority Goals when greater interagency coordination would yield significant progress on strategy priorities.

- **National Coordinating Offices:** The SFO would establish and oversee existing domain-specific coordinating offices—such as NITRD—to drive coordinated implementation of cross-agency strategic priorities.

- **External Expertise**: The SFO would need to draw on considerable outside expertise. In addition to convening technical advisory committees, the SFO would inherit OSTP's contract for external expertise – currently held by the Science and Technology Policy Institute – and be free to reassess and recompete it to gain access to outside science and technology expertise on an ongoing, ad hoc basis.

- **Reporting to Congress**: Accountable to Congress through regular reporting on its work, the SFO would disseminate its strategic plans for review, oversight and guidance.

Strategic Foresight Office: Where to Start?

The SFO for emerging science and technology should start with a focus on artificial intelligence and begin adjacent work on a few other pressing science and tech issues. Focusing first on AI as a platform technology would enable the SFO to develop a baseline of workflows and processes for how it will cover other areas of science and technology, including biotechnology and gene editing, autonomous transportation, microsatellites, smart cities and the Internet of Things, quantum technologies, and robotics.

The SFO should clearly define AI as a public good. When economists define a "public good," they use a very strict definition: it must be *non-excludable,* meaning it is impossible to exclude an entity from using it because to do so would be impossible, and it must be *non-rivalrous*, meaning that when one entity uses it another can use it too. Public goods can also be created in markets, and market-borne public goods can produce unintended consequences. Defining AI as a public good does not preclude companies from earning revenue. But it does provide an opportunity to develop and enforce a common set of norms and standards for those companies, schools and researchers operating within or in partnership with the United States. At the beginning of AI's modern evolution, we can no longer think of AI as a platform built by tech companies in the U.S. and China for digital commerce, communications, and apps. We instead must envision AI broadly as a nonexcludable, non-rivalrous public good that is developed in the best interests of all citizens, rather than just a few tech giants.

The following immediate executive actions can be taken by the SFO:

A. Adapt or develop a rigorous, data-driven methodology for strategic foresight that shares common frameworks, models and vocabulary and can be used throughout all government and military offices. It should include frameworks and methods for: time horizon analysis, broadly-defined stakeholder analysis, defining weak signals, defining and verifying emerging trends, quantifying the velocity and trajectory of change, identifying areas of deep uncertainty, developing data-driven scenarios to confront those areas of deep uncertainty, using those scenarios to backcast near- and long-term strategic actions, quantifying priorities based on established key indicators, and incentivizing continual, incremental action. This methodology, its frameworks and lexicon should become the accepted process for strategic foresight throughout the U.S. government and military.

B. Develop guidelines for the rigorous, data-driven modeling of risk and opportunity. Every science and technology domain studied must incorporate intersections with other areas: education, public health and medicine, workforce, energy, climate.

C. Conduct thorough audits and assessments of government funding in critical areas of science and technology.

D. Develop a tactical, durable plan for driving interagency collaboration.

E. Forge meaningful public-private sector relationships that incentivize collaboration and transparency.

As part of its initial agenda, the SFO should focus on developing the following immediate AI actions:

A. Define a national priority to establish principles, norms and standards for developing and deploying AI in the public interest. Failing to treat AI as a public good—the way we do our breathable air—will result in serious, insurmountable problems. Treating AI as a public good does not preclude the private sector from earning revenue and growing. It means shifting our thinking and expectations. Someday we will not have the luxury of debating and discussing automation within the context of human rights and geopolitics. AI will have become too complex for us to untangle and shape into something we prefer. A public good must meet a standard set of criteria set by a global body, one that has the power and ability to enforce compliance.

B. Develop federal AI capacity. All levels of government —leaders, managers, people who work on budgets, those who write policy—should demonstrate a working knowledge of AI and, ideally, should incorporate those with technical expertise. In such varied places as the Department the Interior, the Social Security Administration, Housing and Urban Affairs, the Senate Foreign Relations Committee, Veterans Affairs, and beyond, there must be AI experts embedded and emboldened to help guide decision-making.

C. Develop and implement a whole-of-government AI strategy. The SFO will be responsible for coordinating everything from federally-funded research to the application of AI for citizen services to ensure a comprehensive federal approach.

D. Spearhead international collaboration on setting guardrails for AI and enforcing standards, testing advanced systems before their commercial release, and monitoring activity as AI progresses from narrow to general to super intelligence. One way to do this would be through a new international entity, the Global Alliance on Intelligence Augmentation, describe in greater depth in my book, *The Big Nine: How the Tech Titans and Their Thinking Machines Could Warp Humanity*.

Learnings from the AI pilot should be used to inform an expansion of the SFO's mandate to include genomics, space, agriculture, education, autonomous transportation and other areas.

Conclusion

The establishment of a Strategic Foresight Office would require significant bipartisan support. However, failing to develop strategies for emerging science and technologies in advance will result in untenable outcomes pitting our legal and governing systems against the public sector. Waiting until game-changing science and technology hits the mainstream will guarantee that the U.S. falls behind other countries. Yielding strategic thinking to special interest groups makes our future dependent on politicking, which always results in poor long-term decisions. The SFO offers an alternative, one in which long-term strategic planning will set us on a responsible course for the future.

About the Author

Amy Webb is a quantitative futurist. She is a professor of strategic foresight at the **NYU Stern School of Business** and the Founder of the **Future Today Institute**, a leading foresight and strategy firm that helps leaders and their organizations prepare for complex futures. Founded in 2006, the Institute advises Fortune 500 and Global 1000 companies, government agencies, large nonprofits, universities and startups around the world. Webb is a Visiting Fellow at Oxford University's Säid School of Business and was a Visiting Nieman Fellow at Harvard University. She was a Delegate on the former U.S.-Russia Bilateral Presidential Commission and advised on the future of technology, media and international diplomacy. Webb was named to the **Thinkers50 Radar list** of the 30 management thinkers most likely to shape the future of how organizations are managed and led and was won the prestigious **2017 Thinkers50 RADAR Award**. Webb's research focus is artificial intelligence, and she has advised three-star generals and admirals, White House leadership and CEOs of some of the world's largest companies on their futures.

Endnotes

[i] Select Committee on Artificial Intelligence, "The National Artificial Intelligence Research and Development Strategic Plan: 2019 Update." National Science and Technology Council, 2019, available at https://www.nitrd.gov/pubs/National-AI-RD-Strategy-2019.pdf.