Written Statement by

John Doerr, Chair, Kleiner Perkins

United States Senate - AI Insight Forum: Innovation

Tuesday, October 24th, 2023

INTRODUCTION:

Leader Schumer, Senators Rounds, Heinrich, Young and Members of the U.S. Senate, I am John Doerr. I grew up in St. Louis, Missouri, trained as an engineer at Rice University, and learned about sales and venture capital in Silicon Valley. I'm the Chair at Kleiner Perkins, a leading venture capital firm with more than fifty years of early-stage investing. We've backed over 1,000 companies, which in turn have created 1.6 million jobs and more than $4.5 trillion in market cap. I want to thank each of you for the opportunity to submit written comments and for your tremendous leadership on this critically important topic—the role of innovation in artificial intelligence.

We are at a tipping point that will determine whether or not the U.S. will remain the global leader in artificial intelligence. This presents both enormous scientific opportunities and also huge challenges that need to be anticipated and addressed, including factuality, bias, privacy, and disinformation. My statement today will cover the importance of U.S. competitiveness, innovation, and the role of investment in maintaining our innovation ecosystem and expanding our global leadership.

TECH TSUNAMIS: A SHORT HISTORY

To anticipate the future, we need to understand previous waves of innovation, along with the ecosystems that allowed them to flourish and create foundational change. I've invested in cutting-edge technologies for over forty years. Like most business people, I've had some hits and a good share of misses. As a venture capitalist, it's my job to look around the corner, to see what's coming next, and to identify patterns or trends. Here's one pattern I'd like to highlight:

Technology Tsunamis–revolutionary swells that transform the world–happen roughly every thirteen years.

- **~1980:** Moore's Law and the incredible shrinking microchip ushered in the personal computer revolution. Things got a lot better, a lot faster, and a lot cheaper. We democratized computing by putting a computer on every desktop.
- **1993:** The web browser and infant internet allowed us to connect with people and information around the world.
- **2006:** A triple play of cloud computing, the inaugural iPhone, and the first app store put a supercomputer in the pocket of consumers everywhere.
- **2019 - Present:** The fourth great tech tsunami–artificial intelligence–has advanced exponentially, and its ripple effects are growing more powerful by the year.

Modern artificial intelligence is touching everything, everywhere, economy-wide.

A LEAD WE CAN'T AFFORD TO LOSE

For more than a century, technological innovation and investment have defined American leadership and greatness. Together, public and private sector funding have fueled advances that have changed the world and turbocharged the American economy. The advent of AI promises vast value creation to the world over. But the benefits from unlocking that value will be disproportionally reaped by those who invest thoughtfully today.

The need to lead on AI is best explained in economic terms. Estimates suggest that generative artificial intelligence alone can add up to $4.4 trillion of value to the global economy annually.[1]

Today, the U.S. is the largest private-sector investor in AI, with China ranking second. Together they make up more than half the world's total private investment in this area.[2] In 2022, overall U.S. investment in AI exceeded China's by a multiple of three.[3] But venture capital data, a critical signpost for private investment, shows that China is hot on our heels, with the U.S. edge in deal numbers sliding from 2x in 2022 to 1.3x in the first half of 2023. Writ large, China has real potential to grow by orders of magnitude in AI–and to leapfrog the U.S. In 2022, McKinsey projected that AI growth in China could add $600B in annual economic value by 2030.[4] In this tortoise-and-hare moment for global AI technology leadership, we cannot afford to be complacent.

In short, it is imperative that the U.S. manage the risks and uncertainties that come with this new technology without yielding on investment and innovation. To keep leading in the 21st century, we must channel our trademark entrepreneurial spirit and continue to set the pace for global innovation.

UNLEASHING INNOVATION

Artificial intelligence is fast becoming the ultimate co-pilot for innovation. As the industry matures, AI technology will keep getting smarter and even more transformational. With appropriate safeguards, it promises to be the biggest and most important tech tsunami yet. It's a lot more than chatbots. It's about breathtaking breakthroughs in science and technology. Even in these very early days for modern AI, remarkable things are happening to dramatically improve our lives.

Early lung cancer detection

Consider lung cancer, the cause of nearly two million deaths per year. Survival is mostly about

---

[1] https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#key-insights

[2] https://aiindex.stanford.edu/wp-content/uploads/2023/04/HAI_AI-Index-Report_2023.pdf

[3] https://www.bloomberg.com/news/articles/2023-06-27/ai-is-next-tech-battle-for-us-and-china-on-chatgpt-frenzy

[4] https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-next-frontier-for-ai-in-china-could-add-600-billion-to-its-economy#/

finding it in time; the five-year survival rate is **seven times higher** when the disease is detected early. At Mass General Cancer Center in Massachusetts, researchers have developed an AI tool called Sybil that can pinpoint tumors with **94 percent accuracy**[5]–*before* they show up on a scan, and when the tissue can usually still be removed.

Stroke detection

AI is being used to detect strokes early and to save lives. In the U.S. over **100,000 people die from strokes every year**.[6] Viz.ai, a technology that **operates in over 1500 hospitals**, uses AI to for early detection of multiple diseases, including strokes, (FDA approved[7]) and for care coordination. The software has been shown to **save 102 minutes** (door-in/door-out),[8] for patients, resulting in a reduction in the amount of brain cell death, increased discharge rates, and better patient health outcomes.

Cheap and quick diabetic vision loss testing

Diabetes is the number one cause of blindness in patients under 65.[9] This vision loss can be successfully treated if caught early. **But only half of the world's 537 million diabetics**[10] **get an annual eye exam**. The FDA has approved two AI platforms that can detect diabetic retinopathy with about **90 accuracy**.[11] Another startup in this space, Vitazi.ai, reports that their AI screening system will be **thirty times faster** than traditional screens, with **95 percent accuracy and lower costs.**[12] The process can be performed by primary care doctors or pharmacists.

Protecting our power grids

In every state of the union, extreme weather is putting our power grids to the test. From 2011 to 2021, **weather-related outages in the U.S. rose by nearly 80 percent**, at an annual cost of **$70 billion to $120 billion.** On any given day, **more than half a million Americans are left without power for two hours or more.**[13] With AI, "self-healing" smart grids[14] can identify a network's weak spots in real time, predict tropical storms or surges in demand, and help to avoid or contain power failures. Global annual cost savings from these AI-enabled grids are projected to exceed **$125 billion**[15] within five years.

A free tutor for every student

Sal Khan, the founder and CEO of Khan Academy, is deploying an AI chatbot called Khanmigo to give every student a personal tutor. Mr. Khan expects Khanmigo to improve outcomes by **two**

---

[5] https://news.mit.edu/2023/ai-model-can-detect-future-lung-cancer-0120
[6] https://www.nichd.nih.gov/health/topics/stroke/conditioninfo/risk
[7] https://www.accessdata.fda.gov/cdrh_docs/reviews/DEN170073.pdf
[8] https://pubmed.ncbi.nlm.nih.gov/36017543/
[9] https://www.cdc.gov/diabetes/data/statistics-report/coexisting-conditions-complications.html
[10] https://www.thediabetescouncil.com/how-many-people-in-the-world-have-diabetes/
[11] https://www.retinalphysician.com/issues/2022/november-december-2022/artificial-intelligence-for-the-screening-of-diabe
[12] https://www.vitazi.ai
[13] https://www.scientificamerican.com/article/preventing-blackouts-power-grid/
[14] https://www.atlanticcouncil.org/blogs/new-atlanticist/leveraging-ai-to-transform-power-grid-security/
[15] https://www.juniperresearch.com/researchstore/healthcare-government/smart-grid-research-report

standard deviations–in other words, to turn average students into exceptional students and struggling students into above-average ones. The chatbot has built-in protections to prevent cheating as well. In a recent survey of three hundred college and high school students, **95 percent said their grades improved** since they began working with AI.[16]

While AI's potential is undeniably awesome, our leadership is not guaranteed. As this new era unfolds, we should and can do more to accelerate these life-changing innovations–and to make sure they're developed by the U.S.

THE INNOVATION ECOSYSTEM

The playbook for scaling and incentivizing innovation is well established: strong educational institutions; focused Research, Development ***and*** Deployment (RD&D); a broad pool of awesome talent; strong government funding; and the preservation of IPOs and M&A as viable avenues for growth. But for this formula to work effectively, each key ingredient must have adequate investment.

Educational Institutions: While the proportion of computer science PhD students specializing in AI in the U.S. increased from 15 percent in 2020 to 19 percent in 2021, we're seeing a widening expenditure gap between private and public institutions. We need talent from every state in our country and every segment of our society. In 2021, the median expenditure for private universities to fund computer science departments was $9.7 million, as compared to $5.7 million for public universities.[17] *The government and private sector must close this funding gap while boosting overall investment in the field.*

Focused RD&D: Research, Development ***and*** Deployment (RD&D) is the lifeblood of the innovation ecosystem. The United States has excelled in RD&D, especially in the private sector. The computing power needed to create cutting-edge AI systems is wildly expensive. (The model behind GPT 4 cost more than $100 million.[18]) By providing computing resources for free or at a steep discount, we will ensure that academic institutions, non-profits, startups, and businesses of all sizes and from every zip code in America benefit from the AI revolution. We cannot accelerate tech and scientific solutions that benefit the public without responsibly liberating data. I support the January 2023 recommendations of the National Artificial Intelligence Research Resource (NAIRR) plan for a federal system to expedite access to computing resources and data sets. *Legislation in both the House and Senate should be passed promptly to authorize and appropriate the NAIRR recommendations and should make all of the aforementioned entities eligible.*

Talent: Nearly two thirds (28 of 43) of the top AI companies in the U.S. were founded or co-founded by immigrants; 70 percent of full-time graduate students in AI-related fields are international students; 42 percent (18 of 43) of top U.S. based-AI companies have founders who

[16] https://www.intelligent.com/new-survey-finds-students-are-replacing-human-tutors-with-chatgpt/
[17] https://aiindex.stanford.edu/report/
[18] https://www.wired.com/story/openai-ceo-sam-altman-the-age-of-giant-ai-models-is-already-over/

studied in the U.S. as international students.[19] Ensuring that U.S. STEM field graduates can stay and work in this country could reduce STEM-related talent shortages by about 25 percent and add up to $233 billion to the U.S. economy this decade.[20] *We need to staple a green card to every computer science graduate student's diploma. At the same time, we must develop a strategic framework to identify regions and industries that will be most impacted by the transition and to create infrastructure to support workers to upskill and reskill.*

Government Funding: Both public and private investment are critical to the innovation ecosystem. The U.S. should set a bold and ambitious goal for government participation. *At a minimum, the federal government should fund the remaining items to be appropriated from the bold CHIPS and Science Act. To turbocharge U.S. capabilities in AI, it should authorize and appropriate the recommendation of the National Security Commission on Artificial Intelligence, as laid out in its 2021 report[21] to "double non-defense funding for AI R&D annually to reach $32 billion per year by 2026." And to ensure geographic diversity and access to technical capabilities, I support federal funding in line with the recommendations in the "Accelerate AI innovation at home" portion of the report, including regional innovation clusters.*

IPOs, Mergers, and Growth: Startups account for the lion's share of job growth in the U.S.—and their ecosystem is not in good shape. Entrepreneurs and investors build their businesses in the hope of creating standalone public companies. But here's today's sobering reality: Ten times as many startups are acquired than complete an IPO. In 2019, 836 startups were acquired and only 82 went public.[22] In recent years, public markets have become more challenging for small-capitalization companies, a reality starkly born out by the data. Since 2000, relative to the preceding two decades, the number of IPOs per year has dropped by more than half.[23] Acquisitions can provide an alternate path to sustain their innovations. Recent proposals to modify existing antitrust rules are having a chilling effect on the startup and venture ecosystem, making it harder for startups to be acquired. *We must sustain a legislative and regulatory environment that avoids stifling the innovation ecosystem. I would go further to say that we need a pro-growth, pro-innovation digital AI Agenda for the United States.*

PROMISE AND OPPORTUNITY

Artificial intelligence offers unprecedented opportunities for world-changing discovery, gains in productivity, and robust economic returns. The U.S. has forged a lead in this arena that we must not squander. With focused and intensified American investment, prudent safeguards, unmatched American ingenuity, and a renewed public-private partnership, we can continue to set the pace in AI for the balance of this century and beyond. This will lead in turn to higher productivity, a wealth of new jobs, and a guarantee of continued American geopolitical leadership. I want to thank each of you for your service to our country and for convening these important forums.

---

[19] https://nfap.com/wp-content/uploads/2023/06/AI-AND-IMMIGRANTS.NFAP-Policy-Brief.2023.pdf
[20] https://www.fwd.us/news/us-international-students/
[21] https://www.nscai.gov/wp-content/uploads/2021/03/Final_Report_Executive_Summary.pdf
[22] https://nvca.org/wp-content/uploads/2020/03/NVCA-2020-Yearbook_PUBLIC-DATA-PACK.pdf
[23] Pitchbook data. Analysis by NVCA.