J.P.Morgan

INNOVATION ECONOMY

Startup Insights

H2 2025

Executive summary

In recent years, an increased emphasis on core strategy and operational efficiency has driven a shift toward smaller, more agile teams. Advances in artificial intelligence have empowered early-stage startups to accomplish more with fewer resources, lowering the cost barriers to building a startup from launching new products to testing out different strategies. This transformation has occurred alongside a more challenging early-stage funding landscape, where many startups are facing greater difficulty securing capital. As a result, fewer seed-stage companies advance to Series A. AI-focused startups stand out as an exception to this trend, graduating to Series A at higher rates and in less time. Location also matters; regions like the Bay Area and New York see faster graduation rates. Today's founders have more options than ever: Some will seek significant investment to capture market opportunities; others will adopt a hybrid approach and more may opt to bootstrap. This diversity of approaches reflects the evolving nature of entrepreneurship in the current AI era.

- Ashraf Hebela

Head of Startup Banking:

Ashraf Hebela
Head of Startup Banking,
Co-Head of Technology Banking

Authors:

Nick Candy
Head of Innovation Economy Insights

Julie Tsang
Innovation Economy Insights Analyst

Vincent Harrison
Innovation Economy Insights Analyst

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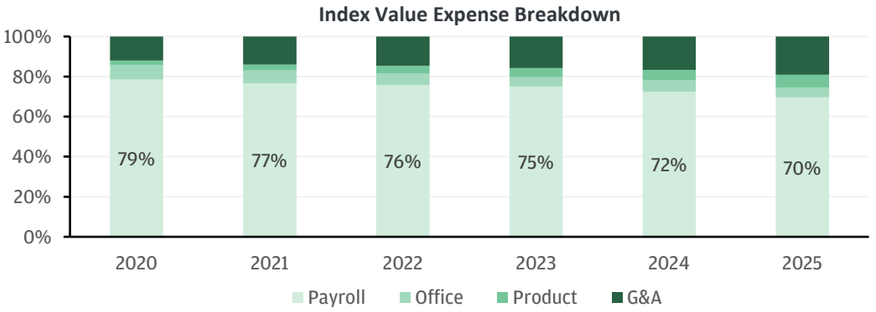
01 | Founder insights

The cost to build a startup is falling

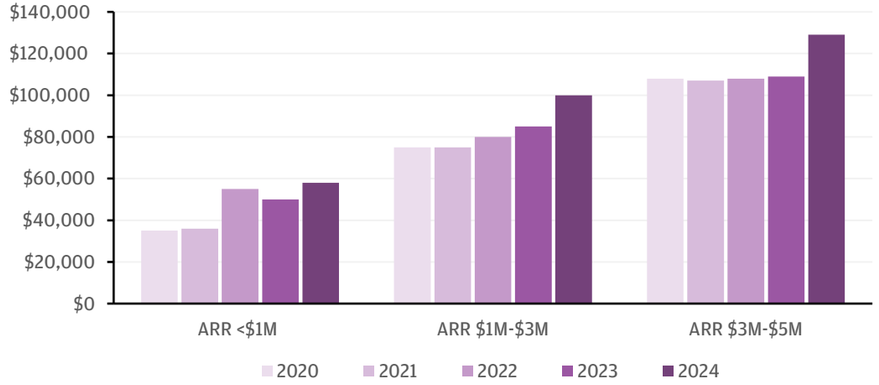
FOUNDER PRICE INDEX—HIGHER COSTS OFFSET BY LOWER HEADCOUNT

MAJOR EXPENSE ITEMS FOR A U.S. EARLY-STAGE SOFTWARE STARTUP INDEXED TO 2020[1]



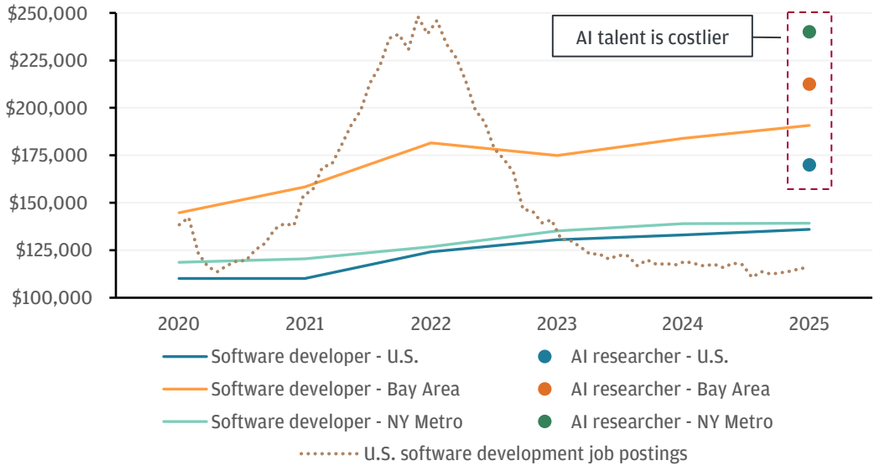
PRODUCTIVITY RISES FOR EARLIER-STAGE SOFTWARE STARTUPS

MEDIAN ANNUAL RECURRING REVENUE (ARR) PER FULL-TIME EQUIVALENT AT SOFTWARE STARTUPS



DEVELOPER WAGES PLATEAU AS DEMAND COOLS; THE NEXT BIG EXPENSE LOOMS

SOFTWARE DEVELOPER WAGES BY U.S. REGION AND OVERALL DEMAND BASED ON JOB POSTINGS



Startup building costs are declining across the innovation ecosystem, though expenses still vary widely by strategy and sector. For most startups, talent is the largest expense, and its cost is driven by market demand. Since the 2022 shift from "growth at all costs" to operational efficiency, demand for some roles has dropped in certain locations. The number of people required to build appears is falling. Adjusting for headcount, the cost to build a startup has declined since 2021, primarily because fewer people are able to produce a similar level of output. This shows in rising employee productivity, especially among early-stage software startups. With continued advancements in AI, productivity is expected to keep increasing. However, costs may also rise as demand grows for AI specialists, who command higher compensation than their software developer peers.

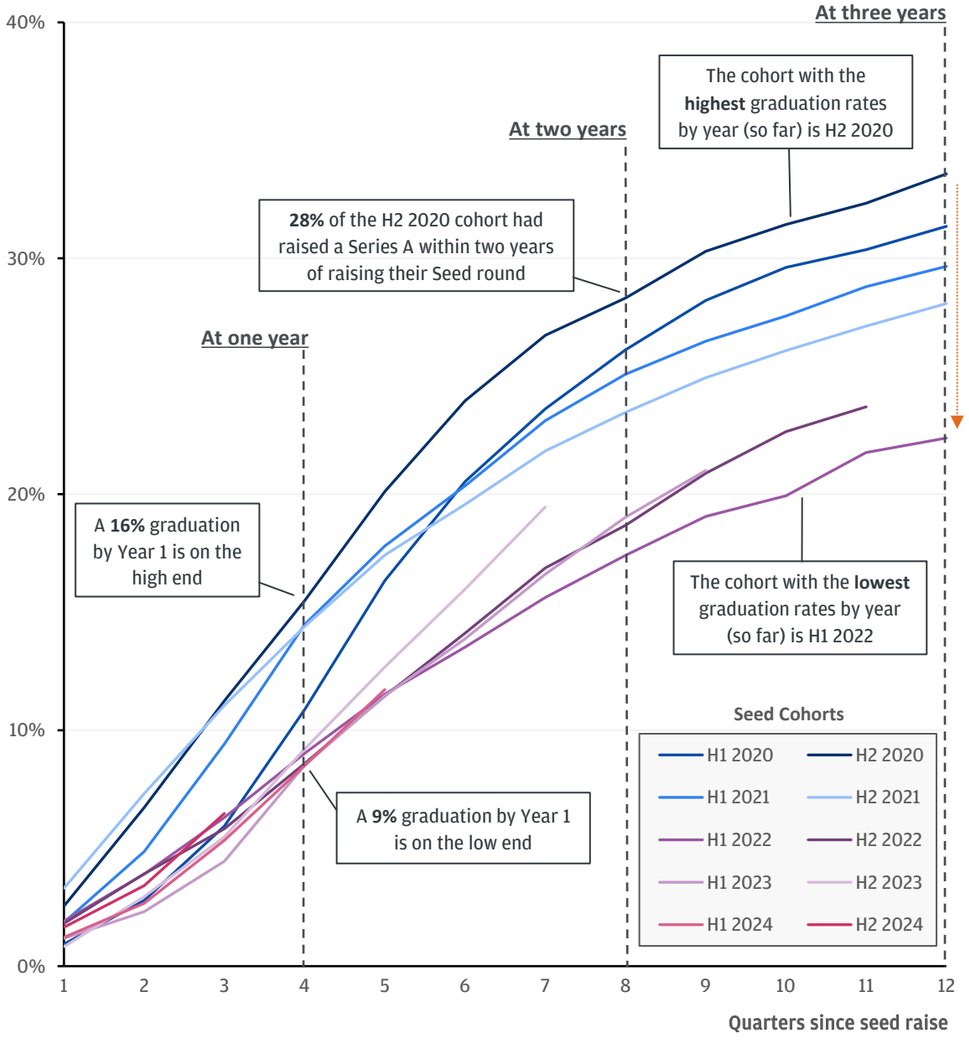
Note: [1] Index components include the major expense categories for an early-stage startup in the software space. Compensation amounts are based on the U.S. median. The primary index value assumes a constant headcount, whereas the head count adjusted measure uses the average number of employees for an early-stage cohort for each year. Expenses are estimated based on publicly available data and validated by J.P. Morgan subject matter experts.

Source: U.S. Bureau of Labor Statistics; Indeed via Federal Reserve Economic Data (FRED); SaaS Capital; PitchBook. Data has not been reviewed by PitchBook analysts.

Seed-to-Series A graduations reflect market environment (and AI hype)

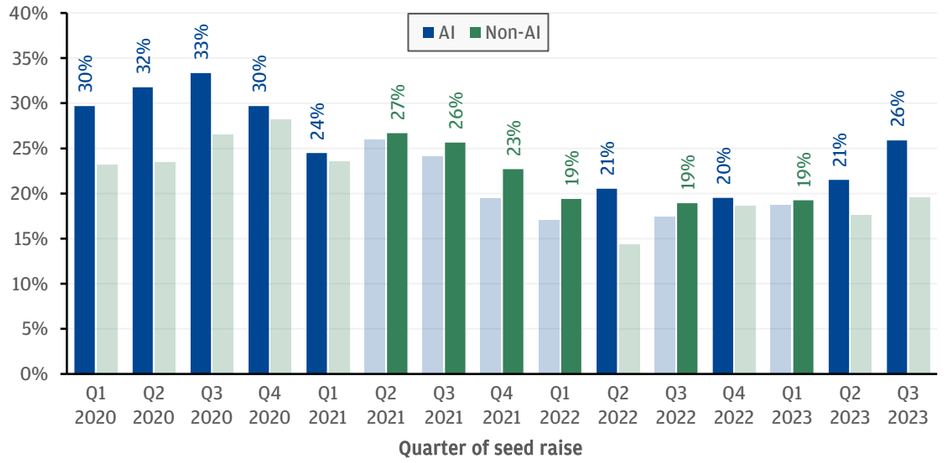
SEED-TO-SERIES A GRADUATION RATES HAVE COME DOWN IN RECENT YEARS

CUMULATIVE SEED TO SERIES A GRADUATION RATE BY COHORT[1]



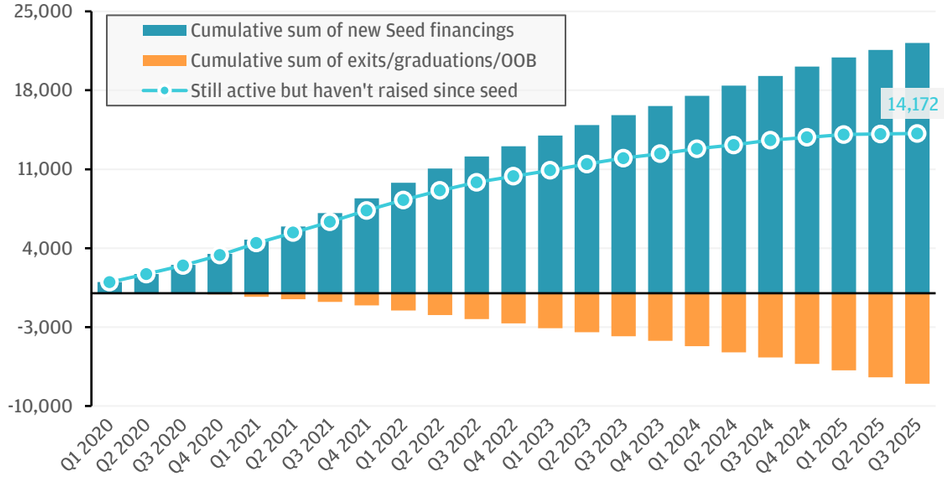
AI STARTUPS MORE OFTEN HAVE A HIGHER GRADUATION RATE VS. NON-AI STARTUPS

TWO-YEAR GRADUATION RATES FROM SEED TO SERIES A, AI STARTUPS VS. NON-AI STARTUPS[1]



SEED BACKLOG CONTINUES TO GROW AS GRADUATION BAR REMAINS HIGH

CUMULATIVE NEW SEED ACTIVITY VS. STILL-ACTIVE AND NON-ACTIVE SEED STAGE COMPANIES[1,2]



The journey from seed to Series A has become more challenging in recent years. Cumulative graduation rates for the 2020 and 2021 seed cohorts remain above more recent cohorts, helped by preceding periods of record capital deployment. AI startups have higher graduation rates than their non-AI peers, but this advantage diminishes when ample capital is available—as in the 2021-22 period. Lower graduation rates aren't necessarily a bad thing if they reflect a deliberate choice by founders. AI startups, by the nature of the opportunity, likely must grow fast, raising capital quickly to do so. Founders building in other sectors have more flexibility to grow conservatively. An alarming trend would be a jump in failure rates, but so far this has not materialized, evident in the growing backlog of seed-stage startups.

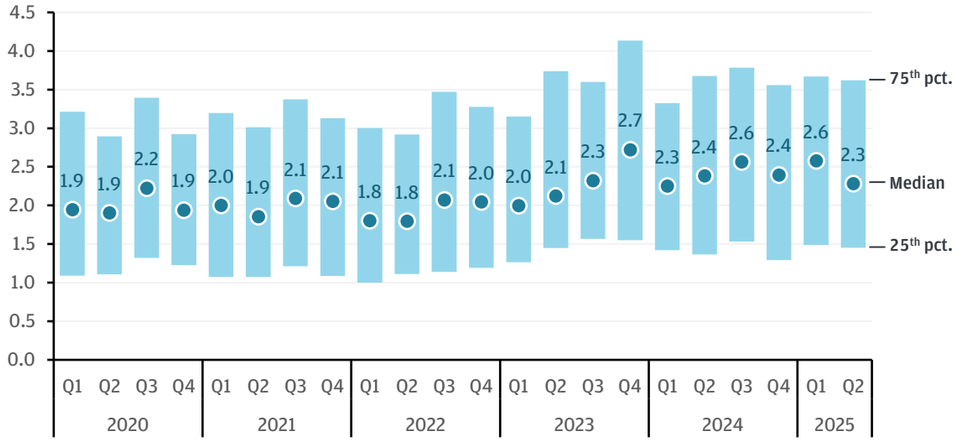
Note: [1] U.S. only. [2] As of Q3 2025. 'OOB' stands for Out of Business.

Source: PitchBook. Data has not been reviewed by PitchBook analysts.

Path to Series A lengthens, but individual experiences may vary

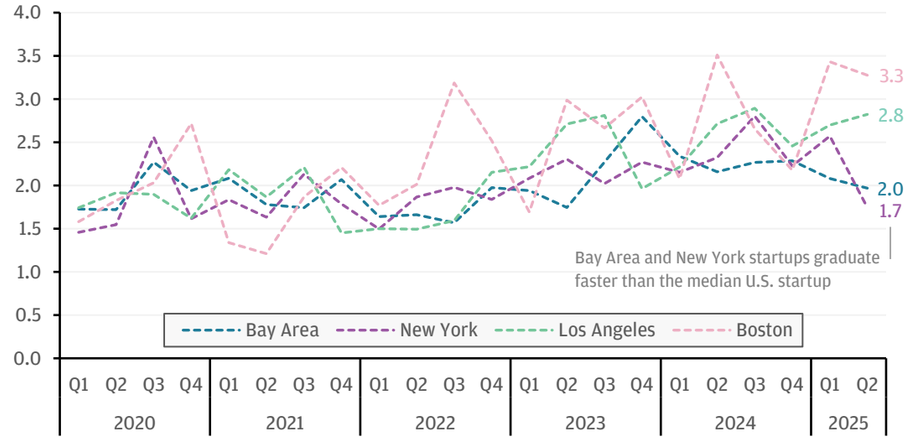
THE PATH TO SERIES A HAS STRETCHED TO ~2.5 YEARS FOR RECENT GRADUATES

MEDIAN TIME TO GRADUATE (YEARS) AMONG SERIES A GRADUATES[1]



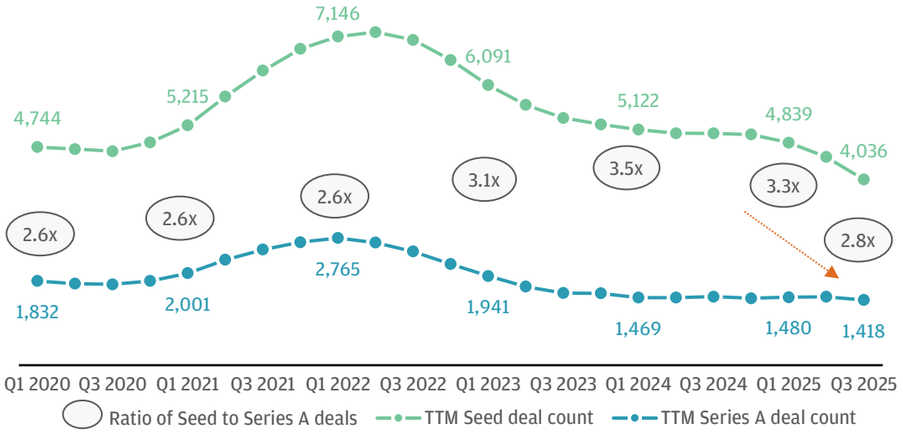
BAY AREA & NEW YORK STARTUPS GRADUATE FASTER THAN OTHER VENTURE HUBS

MEDIAN TIME TO GRADUATE (YEARS) AMONG SERIES A GRADUATES HEADQUARTERED IN SELECT CITIES[1,2]



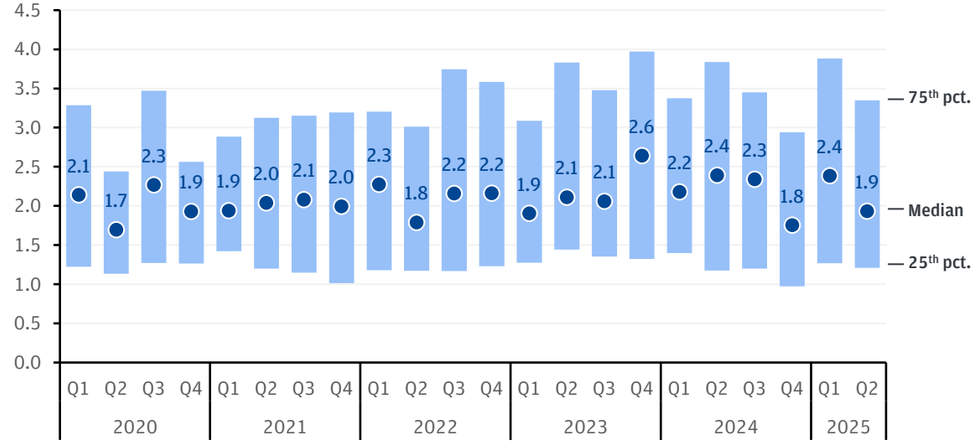
DECLINING SEED-TO-SERIES A RATIO COULD HELP LIFT GRADUATION RATES

TTM SEED DEAL COUNT VS. TTM SERIES A DEAL COUNT AND RATIO OF SEED-TO-SERIES A DEALS[1]



AI STARTUPS HAVE OUTPACED PEERS IN SERIES A GRADUATION SINCE 2023

MEDIAN TIME TO GRADUATE (YEARS) AMONG AI-FOCUSED SERIES A GRADUATES[1]



Over the past year, the median time to graduate has remained steady at approximately 2.5 years—about 38% longer than during peak venture periods. This increase reflects a slowdown in deployment, as investors have higher standards for traction at the Series A stage. A countertrend: more founders are delaying or not raising subsequent rounds of equity capital, as they can do more with less and want to avoid unnecessary dilution while refining their offerings. Approaches vary by region: Bay Area and New York startups consistently raise faster than the U.S. median, while AI companies since 2023 have generally graduated more quickly than the U.S. median. Together, these dynamics reflect different attitudes, with some pursuing rapid growth while others take a more measured approach.

Note: [1] U.S. only. [2] The Bay Area includes the San Jose-San Francisco-Oakland Combined Statistical Area (CSA) defined by the U.S. Census Bureau. New York includes the New York-Newark CSA. Los Angeles includes the Los Angeles-Long Beach CSA. Boston includes the Boston-Worcester-Providence CSA. Each graduate's city is determined by its headquarters location.

Source: PitchBook. Data has not been reviewed by PitchBook analysts.

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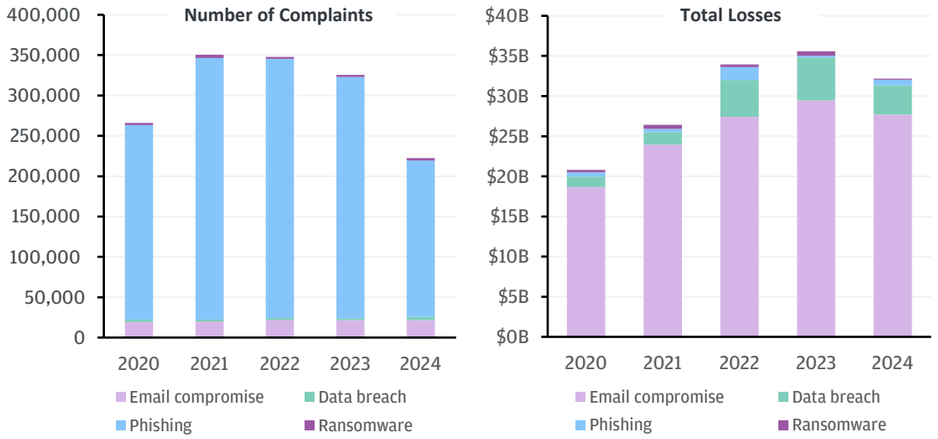
02 | Sector insights

Emerging cybersecurity trends: Defending against cyber threats in the age of AI

PHISHING MOST PREVALENT, BUSINESS EMAIL COMPROMISE MOST COSTLY

CYBER COMPLAINTS & LOSSES REPORTED TO THE FBI BY ATTACK TYPE[1]



CIOs PRIORITIZE CYBERSECURITY AMIDST AN UNCERTAIN GEOPOLITICAL BACKDROP

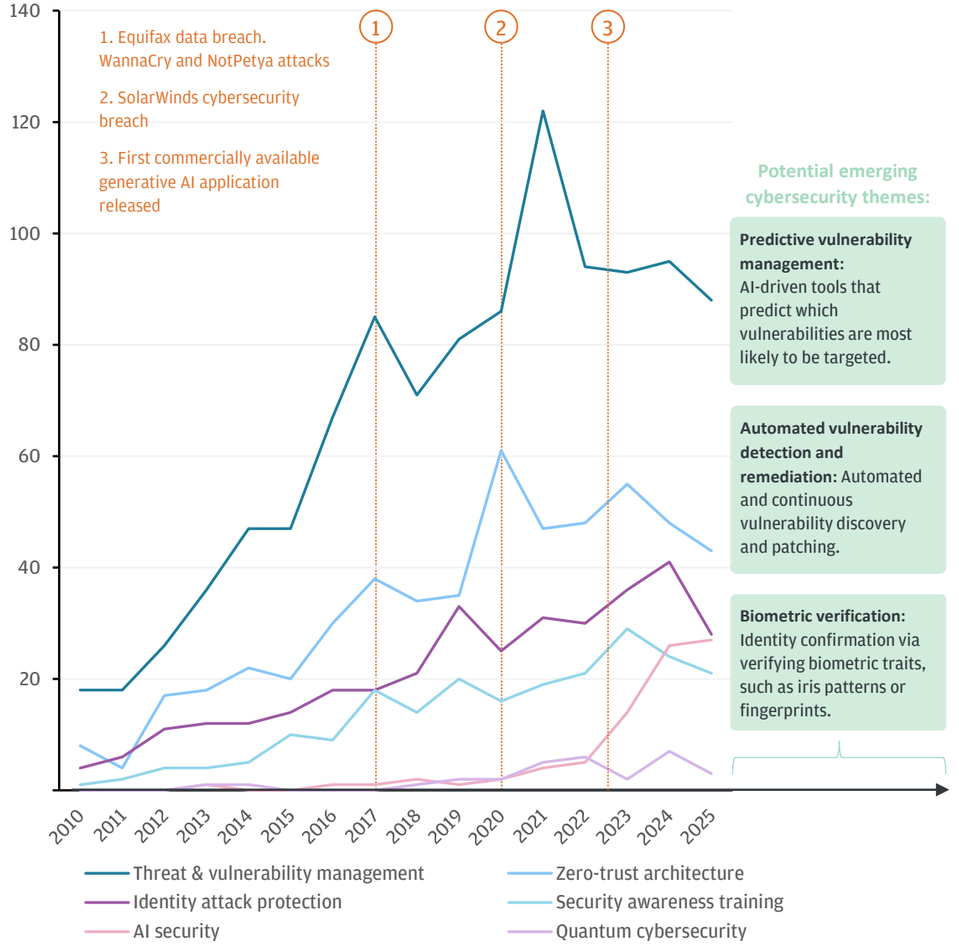
SECURITY THEMES FROM THE J.P. MORGAN ENTERPRISE SOFTWARE CIO SURVEY 2024-2025[2]

- Cybersecurity remains a high-priority spending category for CIOs in 2025.
- With increased cyber threats, targeting critical infrastructure, deferring security investments presents to much of a risk.
- AI brings new challenges and opportunities within the realm of cybersecurity, mentioning vendor's AI solutions and integrations.

- While many CIOs are delaying IT purchases, cybersecurity software providers account for half of the top 10 software vendors where CIOs plan to increase spending, up from 40% in 2024.
- Cybersecurity companies' share of standout small- to medium-sized software vendors increased to 37% in 2025, almost doubling from 21% in 2024.

THE EVOLVING CYBERSECURITY LANDSCAPE: AI AS THE NEXT LINE OF DEFENSE

VENTURE-BACKED DEAL COUNT FOR SELECT BREAKOUT THEMES OVER TIME[3]



Major cyberattacks often serve as catalysts for new waves of cybersecurity innovation and increased investment in startups. The SolarWinds breach is a recent example, where hackers infiltrated thousands of organizations, including the U.S. federal government, and significant data was compromised[4]. AI is transforming cybersecurity in complex ways. While AI is helping analysts detect and manage breaches faster, it is also enabling hackers to deploy more sophisticated attacks, particularly in deepfakes and phishing. Unauthorized use of AI tools by employees, referred to as "shadow AI," is a rising risk. According to a recent Gusto survey of U.S. employees across a range of industries, 45% have used AI at work without informing their manager. Investors are taking note. Since 2024, over 50% of early-stage cyber deals have focused on AI-driven security.

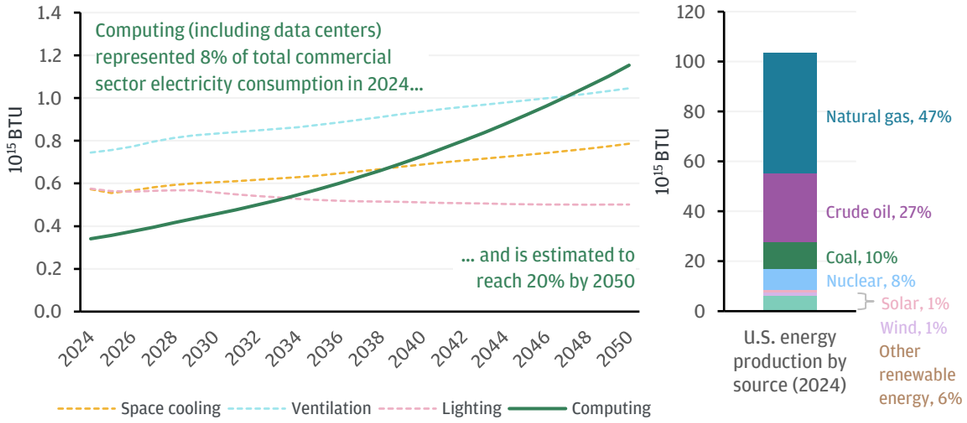
Note: [1]Data is from the Federal Bureau of Investigation's Internet Crimes Center (IC3). Email compromise refers to business email compromise. [2]J.P. Morgan enterprise software CIO survey 2024 and 2025. [3]AI security encompasses emerging cybersecurity tools that protect against vulnerabilities exposed by the increasing usage of AI-enabled tools, including solutions that address AI fingerprinting, agentic AI, AI governance, risk and compliance, AI security posture management, and AI red teaming. 2025 data is YTD as of Sept. 30, 2025. [4]Over 18,000 SolarWinds customers were compromised, including several federal agencies.

Source: The FBI's IC3; GAO; Gusto; J.P. Morgan CIO Survey 2024 and 2025; PitchBook. Data has not been reviewed by PitchBook analysts.

Energy 2.0: Meeting the increasing energy demands of an AI-centric world

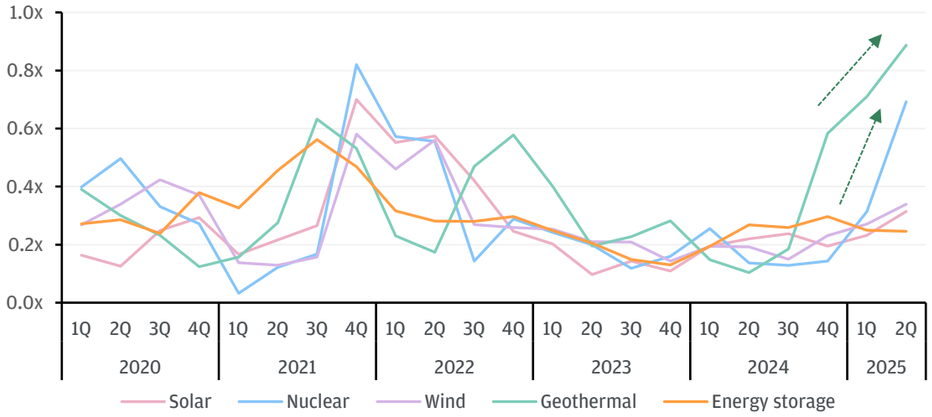
FUTURE ENERGY DEMAND FUELED BY THE RAPID EXPANSION OF DATA CENTERS

U.S. COMMERCIAL PURCHASED ELECTRICITY PROJECTIONS BY SELECT SECTORS[1]



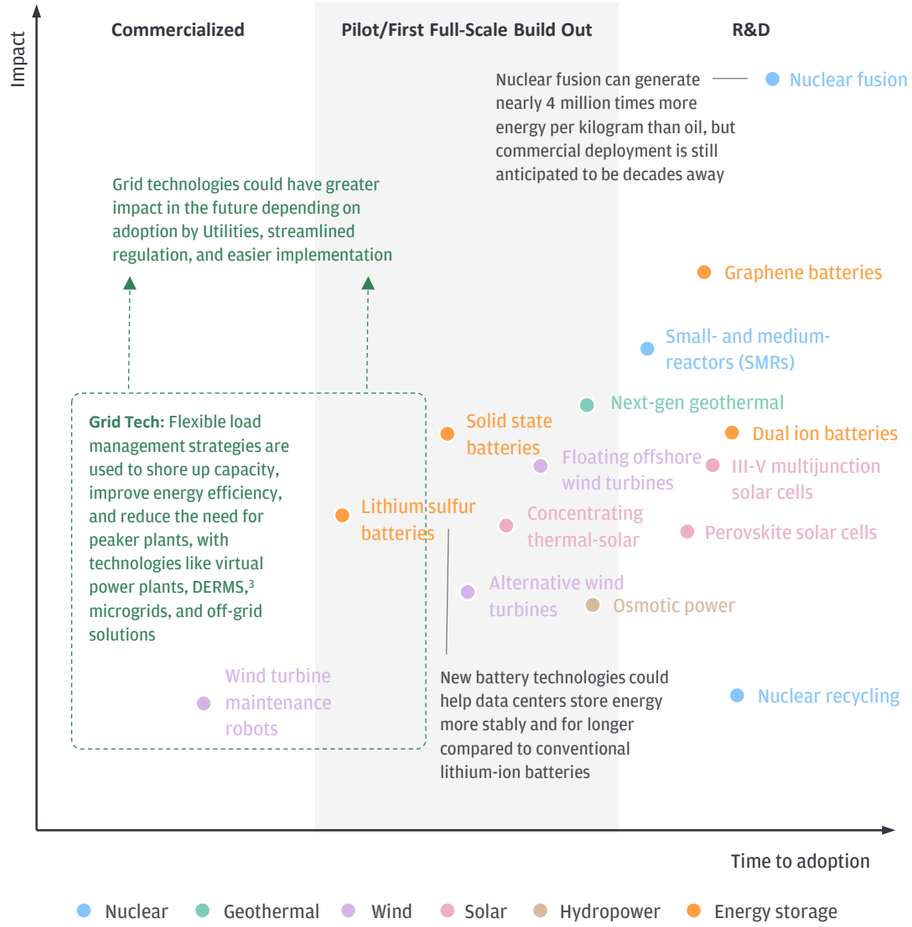
NUCLEAR AND GEOTHERMAL PEAK INVESTOR INTEREST

CAPITAL VELOCITY FOR SELECT RENEWABLE ENERGY SECTORS[2]



NEW ENERGY INNOVATIONS TO POWER THE FUTURE

MAP OF READINESS AND IMPACT FOR SELECT RENEWABLE ENERGY SOLUTIONS



The emergence of the next wave of AI innovation is driving significant increases in energy demand, as companies rush to build data centers to support compute-intensive AI models. Electricity demand from data centers worldwide is set to more than double by 2030.[4] In 2023, data centers accounted for 4.4% of the U.S.'s total electricity. However, this demand could double or triple by 2028.[5] To meet these energy needs, hyperscalers[6] are investing in nuclear and geothermal projects, spurring investor interest in these technologies and driving a jump in capital velocity. The landscape of existing and potential sustainable solutions is broad, ranging from point solutions like lithium-sulfur batteries for improved long-duration energy storage to potential world-changing technologies like nuclear fusion.[7]

Note: [1]EIA estimates from the Annual Energy Outlook 2025. A British Thermal Unit (BTU) is a unit of measurement for thermal energy. [2]Capital velocity is calculated as the average venture funding of the last three quarters/average annual venture funding of the last three years. Hydropower excluded due to limited deal activity. [3]DERMS refers to distributed energy resource management systems. [4]Based on International Energy Agency estimate. [5]Based on Department of Energy report. [6]A hyperscaler is a cloud computing company that operates data centers at a massive scale. [7]For more on this topic, refer to Power Rewired: The new map of energy and geopolitics.

Source: U.S. EIA; Department of Energy; PitchBook. Data has not been reviewed by PitchBook analysts.

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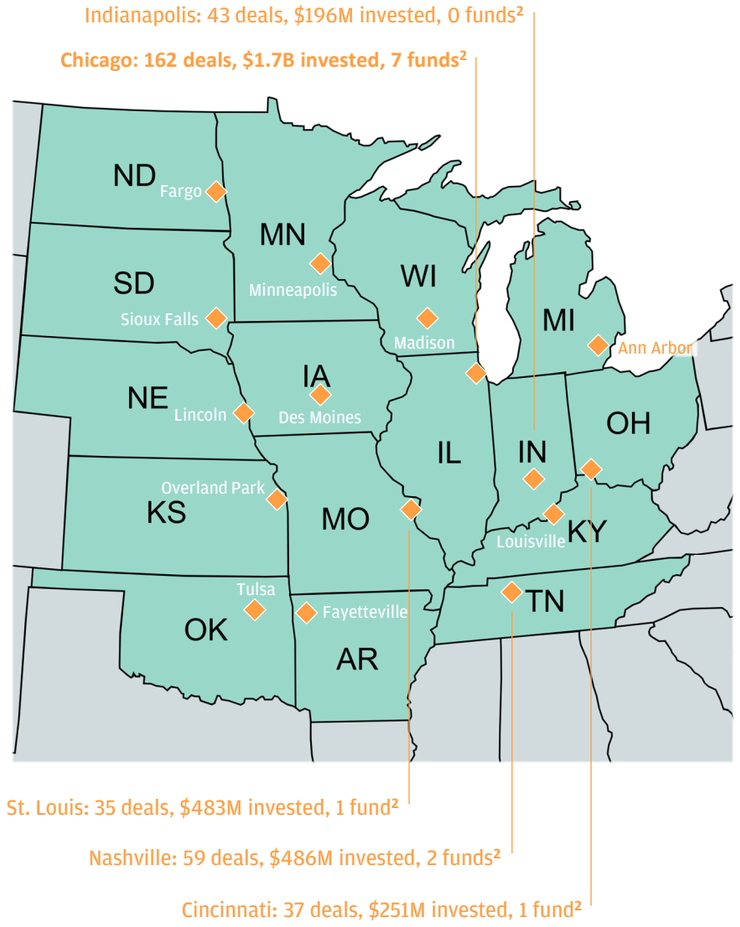
03 | Regional insights

Venturing into the American Heartland

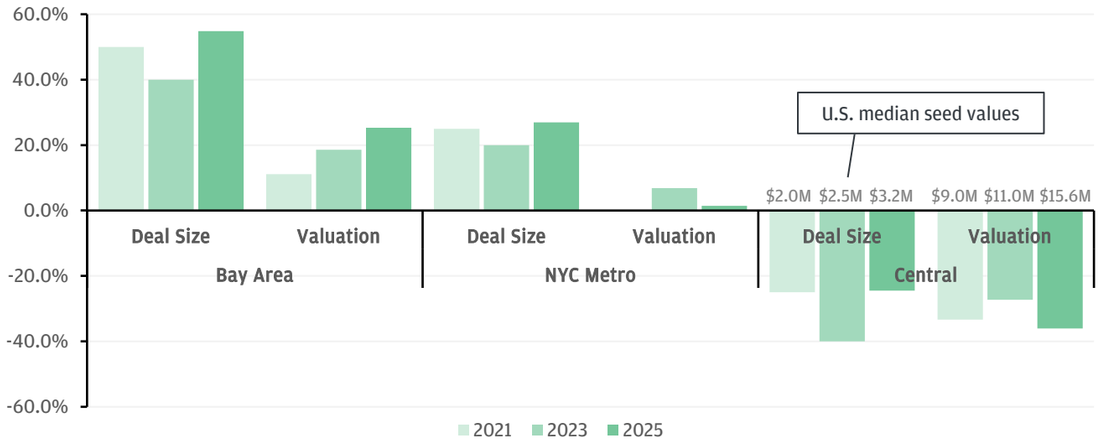
CHICAGO IS THE TOP VENTURE HUB FOR THE CENTRAL REGION

TOP CITY PER CENTRAL STATE BASED ON 2025 VENTURE ACTIVITY[1]



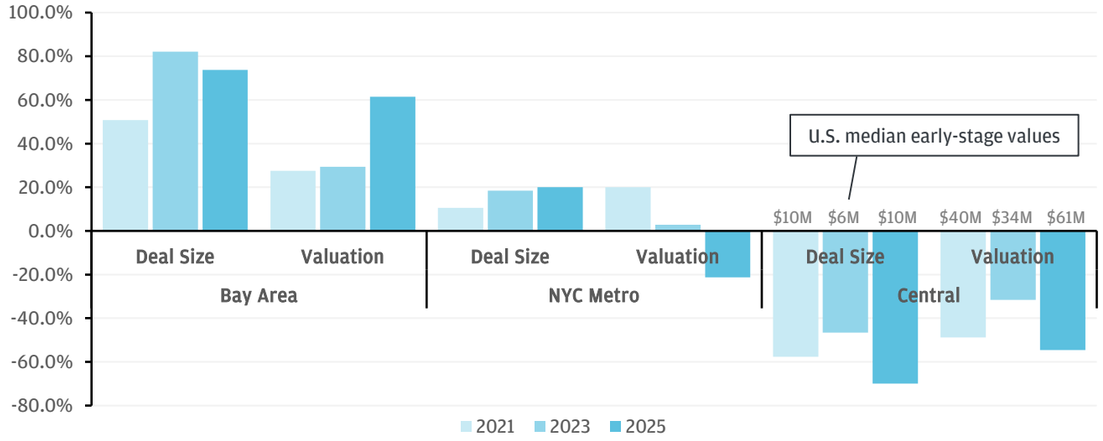
SEED ROUNDS GROW LARGER IN THE BAY AREA

SEED DEAL SIZE & PRE-MONEY VALUATION PREMIUM OR DISCOUNT (%) TO U.S. MEDIAN BY REGION



BAY AREA PREMIUM GROWS FOR EARLY-STAGE STARTUPS

EARLY-STAGE DEAL SIZE & PRE-MONEY VALUATION PREMIUM OR DISCOUNT (%) TO U.S. MEDIAN BY REGION



Startup capital is less abundant in the middle of America compared to top innovation hubs like the Bay Area and New York, in part due to a smaller number of local venture capital firms. This scarcity has led founders in the region to adopt a lean approach to growing their businesses, which in turn can lower the risk of running out of cash. Another advantage is the lower cost of living, which can reduce operating expenses and extend runway. For example, California's COLI[3] is 45% above the U.S. average, while Oklahoma's is 14% below. Startup valuations often depend on capital availability; less availability usually leads to more modest valuations. For founders, accepting measured valuations can help establish a realistic path for growth. For investors, smaller deal sizes and valuations offer the opportunity to spread capital across more investments.

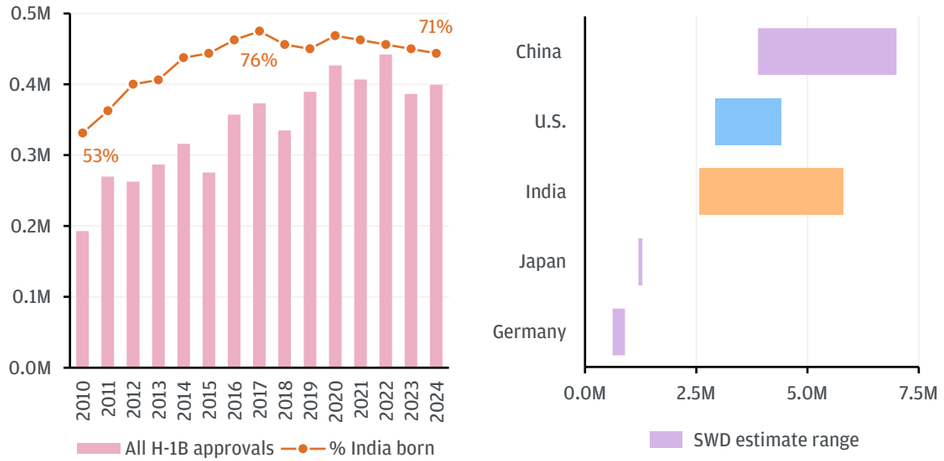
Note: [1]2025 as of Aug. 30, 2025. In this analysis, the central region consists of states designated by J.P. Morgan definitions. [2] Funds represents primary, venture-focused funds raised by investors based in that State. California and New York had 162 and 61 funds raised, respectively.
[3] COLI stands for Cost-of-Living Index developed by the Council for Community & Economic Research.

Source: Council for Community & Economic Research; PitchBook. Data has not been reviewed by PitchBook analysts.

The evolving India-U.S. innovation symbiosis

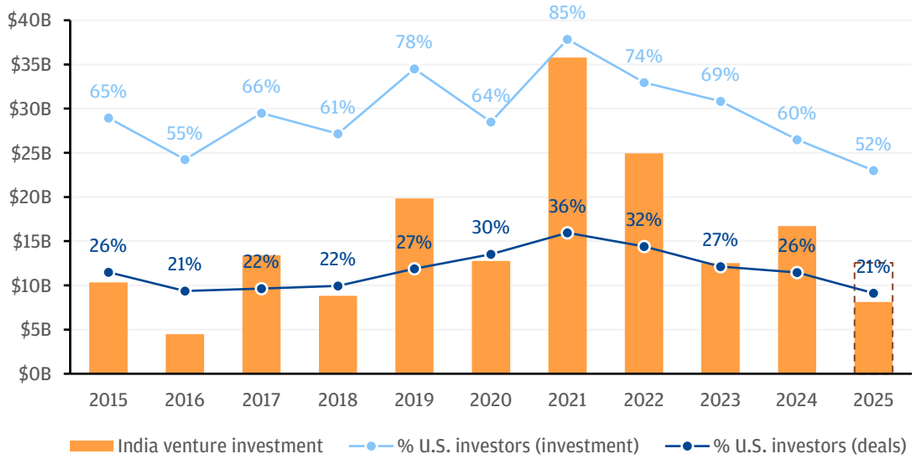
INDIA HAS AN ABUNDANCE OF TECH TALENT

SHARE OF H-1B VISAS HELD BY INDIA-BORN WORKERS & NATIVE SOFTWARE DEVELOPER (SWD) ESTIMATES



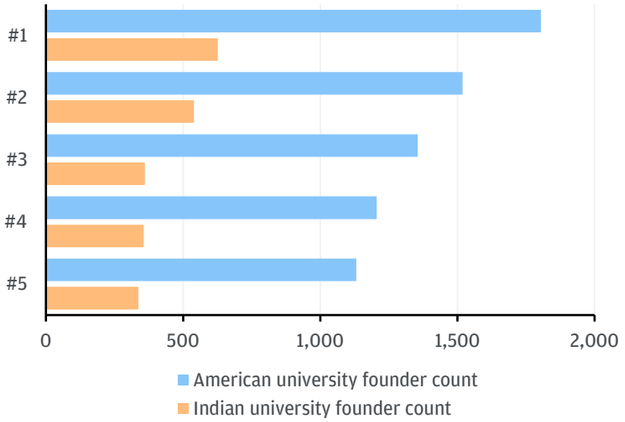
INDIA'S VENTURE ECOSYSTEM BENEFITS FROM HIGH U.S. INVESTOR PARTICIPATION

INDIA VENTURE INVESTMENT AND U.S. INVESTOR PARTICIPATION[2]



THE U.S. AND INDIA SHARE AN ENTREPRENEURIAL MINDSET

FOUNDER COUNTS FOR THE TOP FIVE U.S. AND INDIAN UNDERGRADUATE PROGRAMS[1]

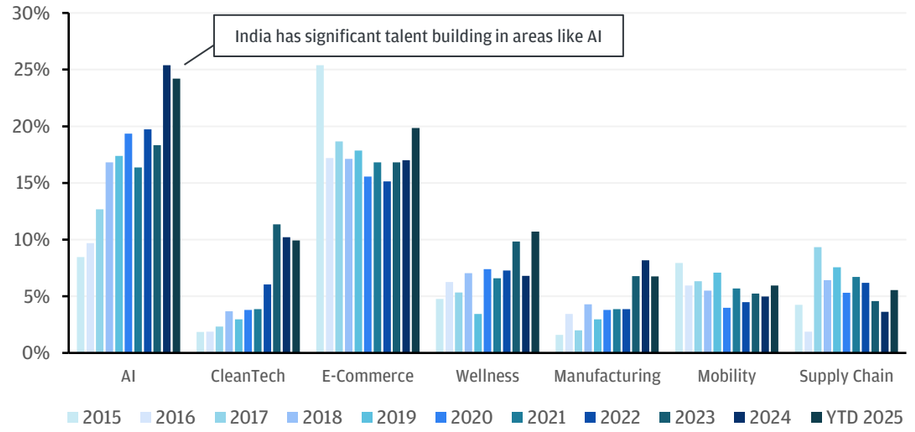


Indian founders formed **1,865** startups since 2014

Indian-founded startups raised **$90B** since 2014

ARTIFICIAL INTELLIGENCE AND E-COMMERCE DOMINATE U.S. INVESTOR INTEREST

U.S. INVESTOR INVESTMENT IN INDIAN VENTURE DEALS BY SUBSECTOR[3]



The U.S.-India innovation axis is well established, revolving around talent and capital. This connection is evolving from the U.S. leveraging India as a low-cost center for workers to one focused on entrepreneurship, high-skilled talent, market potential and innovation. The recent increase in AI deal share for U.S.-based investors is notable, though not unexpected. India, with 1.4 billion residents, is home to a vast number of novel startups and highly skilled engineers, especially in the semiconductor space. These groups are supported by favorable government policies, like the National Strategy for Artificial Intelligence, IndiaAI Mission, and India Semiconductor Mission. Many large U.S. tech firms—especially semiconductor companies—are increasingly establishing design and R&D centers in the country to take advantage of these trends and favorable economics.

Note: [1]Based on undergraduate data only. Top U.S. university graduates' programs produce a significant number of entrepreneurs. [2]2025 data extrapolated based on YTD trend. [3]Subsectors are not mutually exclusive. YTD data as of Sept. 30, 2025.

Source: Pew Research Center; DistantJob; PitchBook. Data has not been reviewed by PitchBook analysts.

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