An Investor’s Guide to Deep Tech

November 2023
By Jean-François Bobier, Anne-Douce Coulin, Constant Morez, Greg Emerson, Kaustubh Wagle, and Antoine Gourévitch

An Investor's Guide to Deep Tech

While many investors were prospecting elsewhere, deep (or emerging) technologies staked out territory as an established asset class—with the returns to match the best venture investments.

Deep technologies are the technologies of the future—the solutions to major global challenges, such as climate change, food shortages, and disease. As investments, they are not for the faint-hearted since they are almost always risky and typically require more capital and greater patience than do other asset classes. But the markets that deep tech opens and the returns that startups realize can be huge.

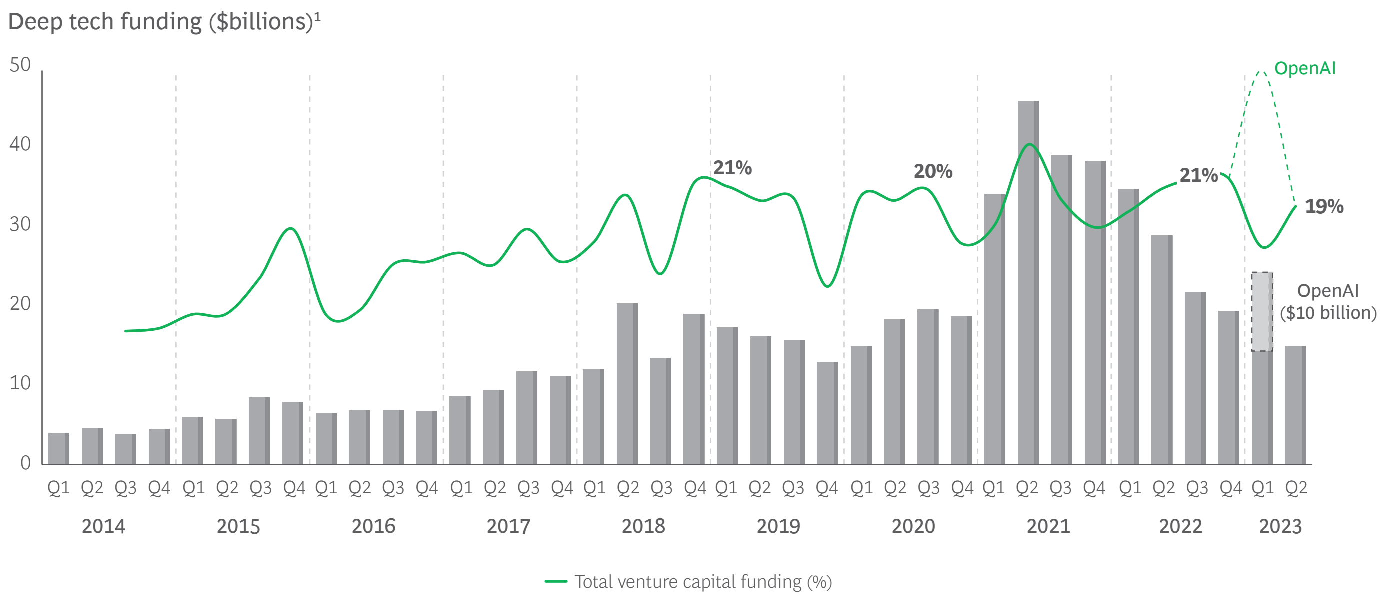
For these reasons, over the past half decade, deep tech has become a mainstream funding destination for corporate, venture capital, sovereign wealth, and private equity investors. Deep tech claims a stable 20% share of venture capital funding, up from about 10% a decade ago. Multiple funding rounds and billion-dollar investments are commonplace. Investors that do not understand the opportunities, which are significant, and learn the ropes, which can be complex, are missing out on attractive returns and an excellent means of diversifying their portfolios.

BCG has been advising on, researching, and writing about deep tech for years. (See the sidebar "A Selection of BCG's Thinking on Deep Tech.") Here's our guide for investors that are now looking into the field.

An Established Asset Class

Venture capital funding of deep tech fell back from a record $160 billion in 2021 to about $105 billion in 2022 and to $40 billion for the first half of 2023—close to 2020 levels. The drop roughly tracked the broader decline in venture funding that resulted from rising interest rates during this period. The more significant point is that deep tech's share of venture funding has held constant at approximately 20% since 2019, signaling that these technologies have come into their own as an asset class. (See Exhibit 1.) Moreover, the size of the average deep tech investment has significantly increased. Many investments now reach $100 million or more, and billion-dollar funding commitments are no longer uncommon.

Exhibit 1 - Deep Tech Has Become an Established Asset Class, Accounting for a Stable 20% of Venture Capital Funding



Sources: Dealroom; BCG analysis.

[1]Includes all companies worldwide that have completed Series B financing and subsequent rounds, accounting for more than 90% of total funding.

A Selection of BCG's Thinking on Deep Tech

BCG has published dozens of pieces in recent years on various aspects of deep tech. Here's a selection of our more recent thinking.

Can Carbon Help Decarbonize Chemicals?
An article by Boston Consulting Group, September 2023

Making Sense of Quantum Sensing
An article by Boston Consulting Group, July 2023

Fast-Tracking Green Tech: It Takes an Ecosystem
A report by Boston Consulting Group, May 2023

Quantum Computing Is Becoming Business Ready
An article by Boston Consulting Group, May 2023

Ushering in the Next Generation of Climate Technology
An article by Boston Consulting Group, April 2023

The CEO's Guide to the Generative AI Revolution
An article by Boston Consulting Group, March 2023

How Synthetic Biology Can Make a Materials Difference
An article by Boston Consulting Group, February 2023

Taking Alternative Proteins Mainstream
A report by Boston Consulting Group, February 2023

Can Europe Create Its Own Deep-Tech Giants?
An article by Boston Consulting Group, August 2022

What CEOs Need to Know About Deep Tech
A report by Boston Consulting Group, May 2022

Meeting the Challenges of Deep Tech Investing
An article by Boston Consulting Group, May 2021

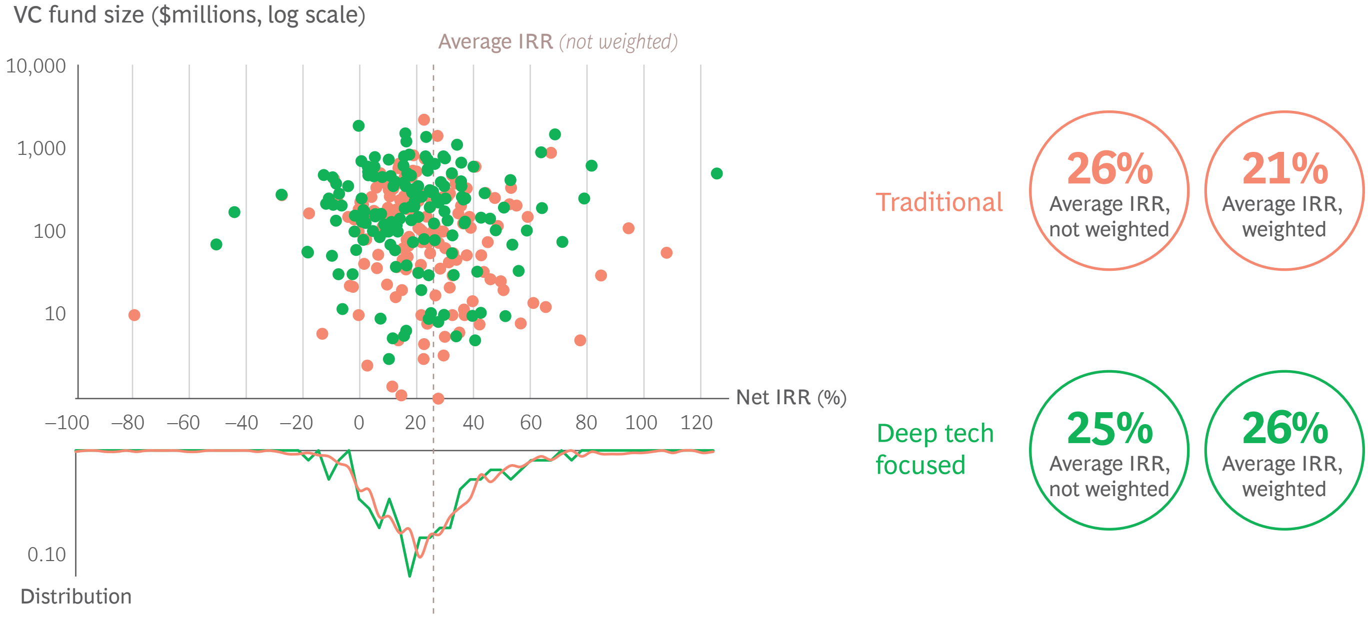
One big reason for all the interest is returns. While deep tech investments tend to be complex and often have lengthy time horizons, our analysis shows almost no difference in the internal rate of return between traditional and deep tech-focused venture funds. (See Exhibit 2.) Another factor is that the difficulty of finding an exit strategy is dissipating. Our analysis shows little difference in the percentages of traditional and deep tech venture investments that cashed out via corporate acquisitions (53% and 51%, respectively), IPOs (36% and 31%), and private equity buyouts (7% and 3%).

Then there's the fact that many deep tech companies have become well-known names, and more than a few—among them Commonwealth Fusion Systems, Cruise, Good Meat, Rocket Lab, and Waymo—have raised eye-popping sums.

Big Impact, Large Markets

Perhaps the most important thing to understand about the opportunities for investors is that deep tech offers attractive rewards because its companies tackle large problems. Startups seek to make big societal, technological, or economic impacts that unlock hefty markets. Funds can benefit from eye-catching returns while hedging their portfolios and diversifying away from software and other traditional technology investments. At the moment, deep tech as an asset class is attractive relative to other technology investments because premiums are low and valuations are moderate. Many of these technologies have yet to enter the mainstream, and marketplaces have not become crowded with competing funders.

Exhibit 2 - Traditional and Deep Tech-Focused Funds Deliver Similar Internal Rates of Return



Sources: Preqin; BCG analysis.

Note: VC = venture capital. n = 911 for traditional funds, and n = 164 for deep tech-focused funds. Only 150 randomized data points are shown on the scatter plot.

Consider the following four areas of impact. (See Exhibit 3.)

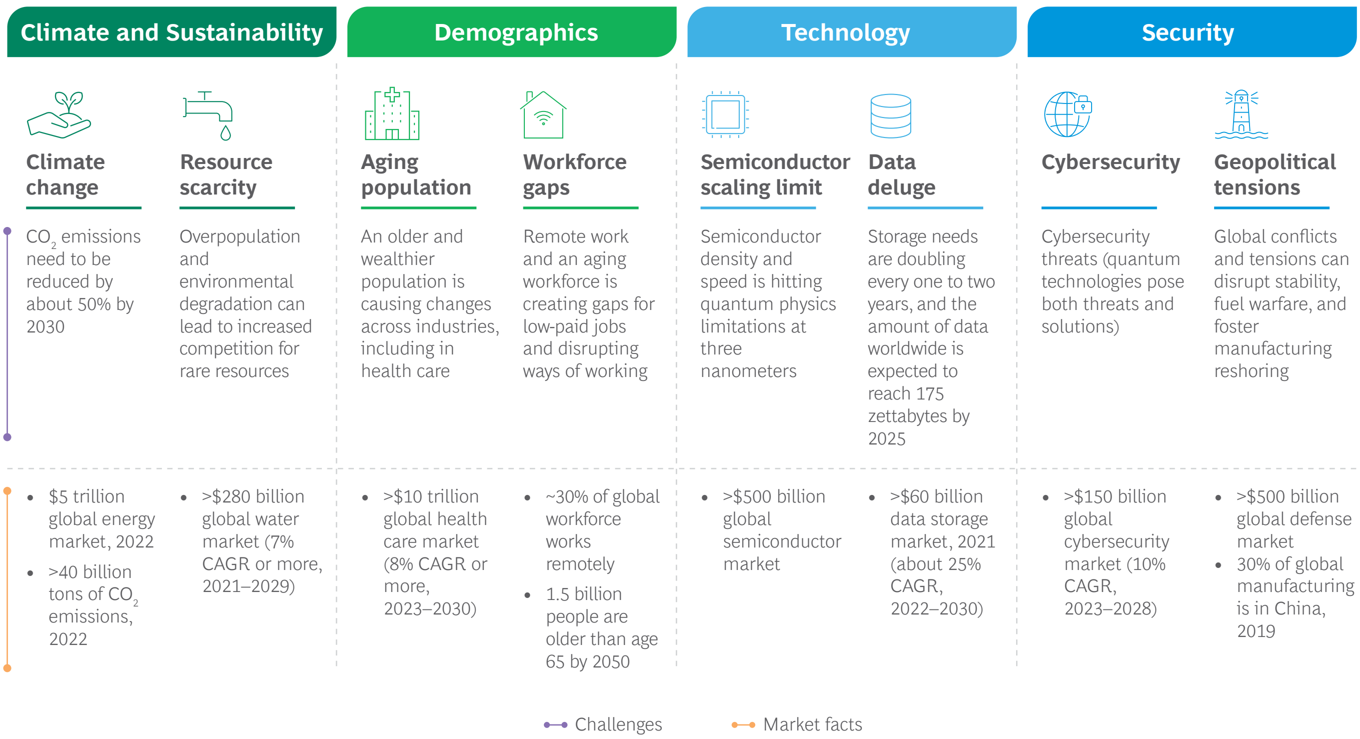
Climate and Sustainability. Greenhouse gas (GHG) emissions from the $5 trillion global energy market reached an all-time high of more than 40 billion tons of CO_2 emissions in 2022, or about three-quarters of the global total, according to the International Energy Agency. Climate experts predict that 75% of GHG emissions reduction will require new technologies, such as nuclear fusion, solid-state batteries, CO_2-based chemicals and materials, and electrolysis—all solutions being pioneered by deep tech firms. Other deep tech companies are seeking answers for resource scarcity, including alternative proteins, biorecycling, deep-sea mining, and green solvents.

Demographics. The world's aging population will fuel the $10 trillion global health care market to grow at 8% or more through 2030. Deep tech startups are working on solutions such as service robots, biosensors to monitor health, AI-powered drug discovery, and drug biomanufacturing. Meanwhile, the combination of the aging workforce and remote work are creating gaps and disruption in the workplace, as well as in ways of working. These shifts can be addressed by advanced technologies, such as AI augmentation, autonomous systems, augmented and virtual reality, and factory automation.

Technology. The $500 billion global semiconductor market is approaching the physical limits of chip density and speed. Quantum computing, neuromorphic computing, photonic computing, and semiconducting nanomaterials can address current semiconductor limits. At the same time, data storage needs to double every one to two years to handle the worldwide volume of data, which is forecast to reach 175 zettabytes by 2025. Analysts expect 25% annual growth in the more than $60 billion data storage market. Technologies such as DNA storage, quantum sensing, and next-generation networking have the potential to address this data deluge.

Security. The world is not getting any safer. Cybersecurity threats power a $150 billion global market growing at more than 10% a year. Global conflicts and tensions can disrupt stability, foster warfare, and push the need for manufacturing reshoring. Quantum communications, AI-augmented cybersecurity, biomanufacturing, additive manufacturing, drones, and high-precision sensors are all nascent to fast-developing solutions.

Exhibit 3 - Big Challenges Require New Technologies



Sources: Statista; International Energy Agency; BCG analysis.

Patience and Deep Pockets Required

Deep tech investing typically involves backing technologies that are still developing the underlying science; considering potential markets and drafting business plans lie in the future. Investors need to prepare for a multistage journey that often includes growing funding needs as technologies mature toward market readiness, since deep tech ventures need to overcome both scientific and technological risks. (See Exhibit 4.)

In the earlier stages of deep tech development, the principal risks are scientific, and the big challenge is often moving the technology out the lab and into the real world. Hurdles abound, many involving researchers who can lack business acumen and entrepreneurial spirit (common among those making a switch from academia). Researchers can be overly focused on the technology rather than the problem they are trying to solve, and misalignment between company founders and investors is common when it comes to expectations relating to financing, returns, and timetables. Long, complex, and highly variable ownership models for technology and intellectual property also must be worked out.

Another set of challenges awaits investors in companies moving through the stages from seed to growth. More than 80% of deep tech ventures are building physical products, which involves risks related to engineering and unit economics, as well as commercialization and scalability. Early investors need to be concerned with how to secure later funding and, frequently, a recognized lead investor that can help attract others from a broader investor pool that is more risk averse and concerned about time horizons and exit options. Later-round investors are typically looking at much bigger funding amounts (as much as 20 times larger for Series C, compared with Series A) as startups seek to prove the commercial viability and scalability of their products. As a former partner of a deep tech venture fund said, "Capital injection sizing for deep tech has a step change increase for later funding rounds, after the underlying technology has proven its thesis and scalability."

Exhibit 4 - Deep Tech Ventures Face Technological and Other Challenges Throughout the Investment Life Cycle

	Grants	Seed	Series A	Series B	Series C and beyond	Growth
Funding stage	Conduct foundational research at the university level	Isolate an idea on the basis of scientific research	Plan to create an initial prototype	Develop prototype iterations to prove that the technology is viable	Have a proven technology	Look to scale and monetize product
State of product	NA	Idea	Pre-prototype	Initial prototype	Iterated prototype	Product that is ready to scale
Average investment	Primarily government or university grants	$1 million to $5 million	$5 million to $20 million	$20 million to $50 million	More than $50 million	More than $100 million

Challenges inherent to deep tech

Challenge	Grants	Seed	Series A	Series B	Series C and beyond	Growth
Scientific risk: Proving the concept[1]	✓	✓	✓	✓	✓	✓
Engineering risk: Making the idea work				✓	✓	✓
Unit economics risk: Making the product affordable					✓	✓
Commercialization risk					✓	✓
Scalability risk						✓

Sources: PitchBook; BCG analysis.

Note: NA = not applicable.

[1]Some scientific risk may persist in the growth phase for the deepest of deep technologies, such as nuclear fusion and quantum computing.

Deep tech is now a mainstream funding destination for corporate, venture capital, sovereign wealth, and private equity investors.

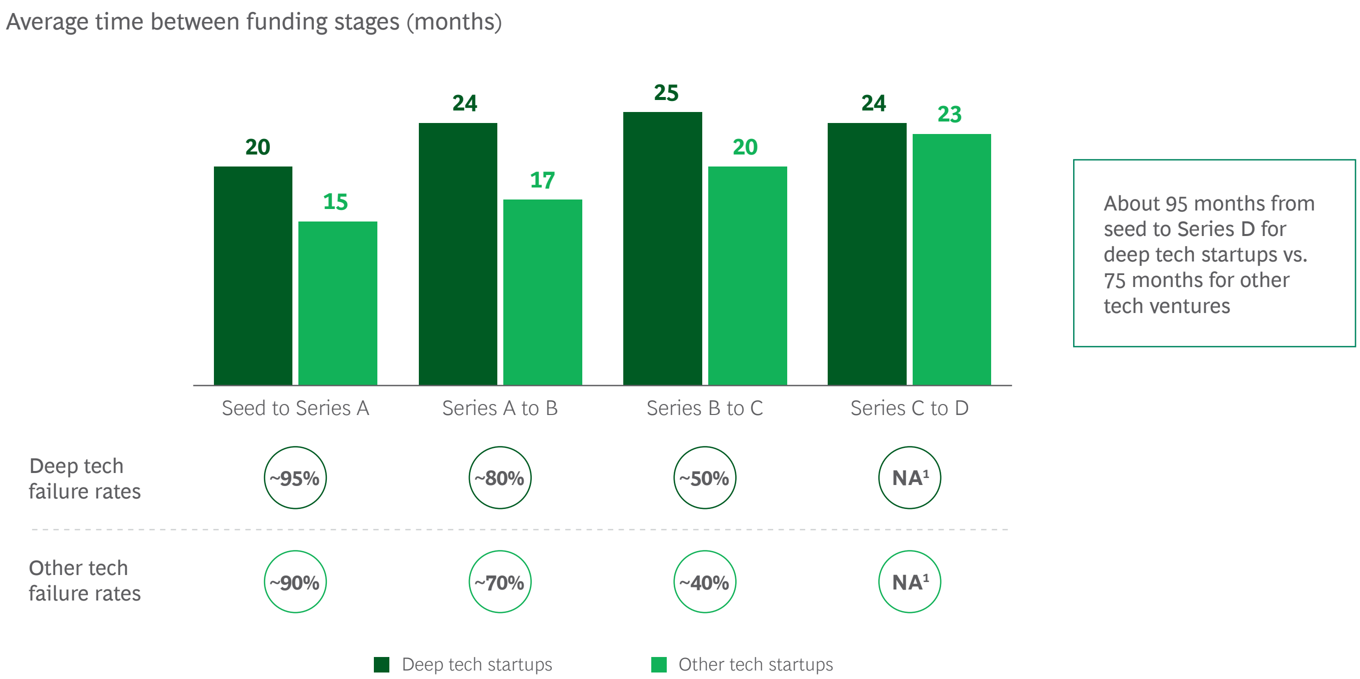
Patience is a virtue because deep tech investments take longer than other tech investments to mature—an average of 25% to 40% more time between funding each stage from seed capital through Series D. These ventures also are at greater risk of failure at each stage. (See Exhibit 5.) It is not uncommon, especially for larger funds that start investing in the early stages, to participate in multiple funding rounds. Our survey of deep tech funds with more than $1 billion in assets showed an average of 42% of investments as multiround.

The deepest of deep technologies, such as nuclear fusion and quantum computing, carry scientific risks that can persist from the lab to the growth phase. The risk averse need not apply. Others may want to establish a foothold in technologies that have the potential to disrupt entire industries and balance their portfolios among technologies in varying stages of maturity.

Where and How to Play

BCG analyzed deep tech investments along two dimensions—technologies and use cases—in the four areas of impact described above. (See Exhibit 6.) Multiple technologies (such as digital AI, autonomous systems, and advanced physics and chemistry) and use cases (including mobility and logistics, energy and climate, and health and well-being) are attracting substantial shares. Cross-industry platforms, both physical and digital, are also popular funding destinations. (For a breakdown of where the money has been going, see the sidebar "What Deep Tech Investing Looks Like Today.")

Exhibit 5 - Deep Tech Investing Requires Patience, Since Most Startups Need More Time and Funding Rounds Than Do Other Tech Investments

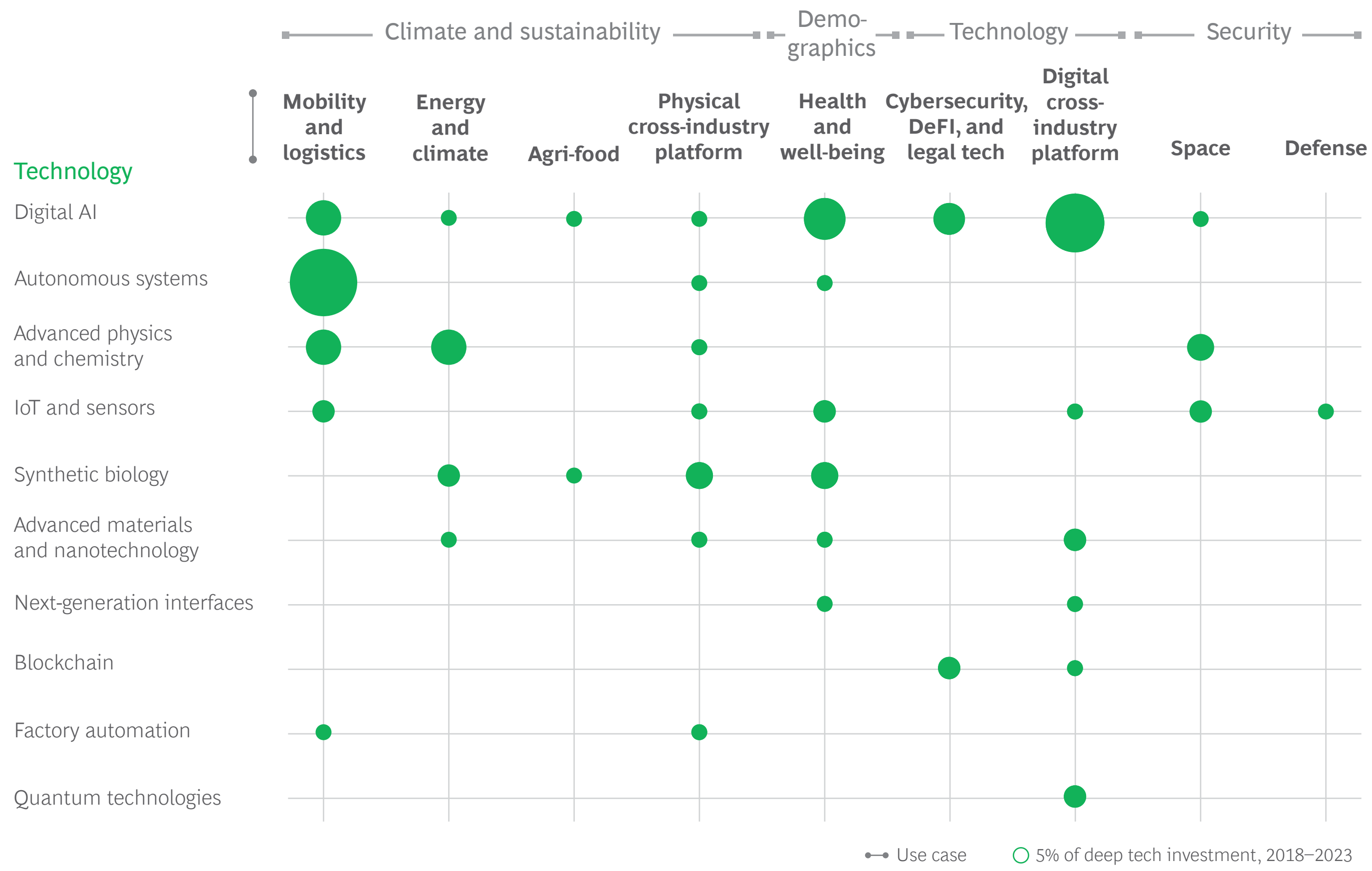


Sources: Preqin; expert interviews; BCG analysis.

Note: NA = not applicable. A small data set of deep tech companies was used because only about 15 to 50 deep tech companies are on the path to an IPO. A startup failure was defined as a company ceasing operation.

[1]Failure rates are not applicable because they vary by venture type.

Exhibit 6 - Funders Are Making Deep Tech Investments in Four Main Areas



Sources: Dealroom; BCG analysis.

Note: DeFI = decentralized finance; IoT = internet of things. Use cases linked to societal challenges represent 95% of deep tech investments.

We also analyzed the activity of deep tech's current pool of investors. Each fund follows its own strategies, of course, but patterns over the past several years have revealed five types of investors that are active at different stages of the investment life cycle. (See Exhibit 7.) Each type has built differentiated skills and capabilities to support its approach. There also may be other ways to play, but these five archetypes offer a variety of models for others to consider.

Genius Hunters. These are small funds that have strong ties to research institutions and that are focused on seed investments. They number about 500 in total and are located close to large research institutions. They typically have less than $100 million in assets under management. Genius hunters concentrate on pre-seed and seed investments that are typically $1 million to $5 million and that have a time horizon of three to five years. Each fund focuses on one or two investment theses, such as molecular biotechnology, planetary health, and food and agriculture.

What Deep Tech Investing Looks Like Today

Our analysis of deep technologies reveals clear patterns of investment activity over the past five years. (See the exhibit "Deep Tech Investments Can Be Classified into Ten Technology Groups.") Digital AI, the backbone technology of deep tech, accounted for almost one-third of investments. Autonomous systems attracted a fifth of the funding, and advanced physics and chemistry, sensors and the internet of things, and synthetic biology received another 32%.

The fundamental challenges that these technologies seek to solve can be classified into ten categories of use cases. (See the exhibit "Among Use Cases, Mobility and Digital Cross-Industry Platforms Have Received Almost Half of Deep Tech Investments.") A handful of areas are of very high focus for investors. After mobility and logistics (27% of funding) and digital cross-industry platforms (21%), investors are interested in health and well-being (15%), energy and climate (9%), physical cross-industry platforms (8%), and space (7%). All of the startups operating in these areas could be the unicorns of tomorrow.

Deep Tech Investments Can Be Classified into Ten Technology Groups

Technology	Funding, 2018–2023 (%)[1]	Applications	Sample companies
Digital AI	31	AI drug discovery, generative AI, and enterprise workflow	Anthropic, Dataminr, DataRobot, OpenAI, and Trax
Autonomous systems	20	Electric vehicles, autonomous driving, drones, robots, eVTOL aircraft, and nanosatellites	Cruise, Nuro, Rivian, Waymo, and WM Motor
Advanced physics and chemistry	13	Battery technology, energy production, green solvents, and propulsion systems	CommonWealth Fusion System, Northvolt, Relativity, SpaceX, and TAE Technologies
IoT and sensors	10	Next-generation telecommunications (near and long term), video sensors, movement sensors, sound sensors, and microscopes	Oneweb, Oxford Nanopore Technologies, and Sila Nanotechnologies
Synthetic biology	9	Bioreactors, novel protein and cell design, and gene sequencing and writing	Ginkgo Bioworks, Inari Agriculture, LanzaTech, Laronde, and Upside Foods
Advanced materials and nanotechnology	7	Semiconductors, metal alloys, construction materials, biomaterials, and nanomaterials	Bolt Threads, Form Energy, Moore Thread, and Unisoc (Shanghai) Technologies
Next-generation interfaces	3	AR and VR headsets, optical waveguides, haptics, and digital twins	Improbable, Magic Leap, MindMaze, Neuralink, and Niantic
Blockchain	3	Blockchain and homomorphic encryption (platform only, excluding use cases such as nonfungible tokens)	Consensys, Ledger, and Near
Factory automation	2	Industrial robots, additive manufacturing, and automation software	Exotec, Geekplus Technology, Icon Technology, Infarm, and SJ Semiconductor
Quantum technologies	1	Quantum computing, quantum communications, and quantum sensing	IonQ, PsiQuantum, and Xanadu

Sources: Dealroom; BCG analysis.

Note: IoT = internet of things; eVTOL = electric vertical takeoff and landing; AR = augmented reality; VR = virtual reality; NFT = nonfungible token. Because of rounding, percentages don't add up to 100.

[1]Funding for companies that have completed Series B funding and later rounds, accounting for more than 90% of their total funding from the beginning of 2018 through the first half of 2023.

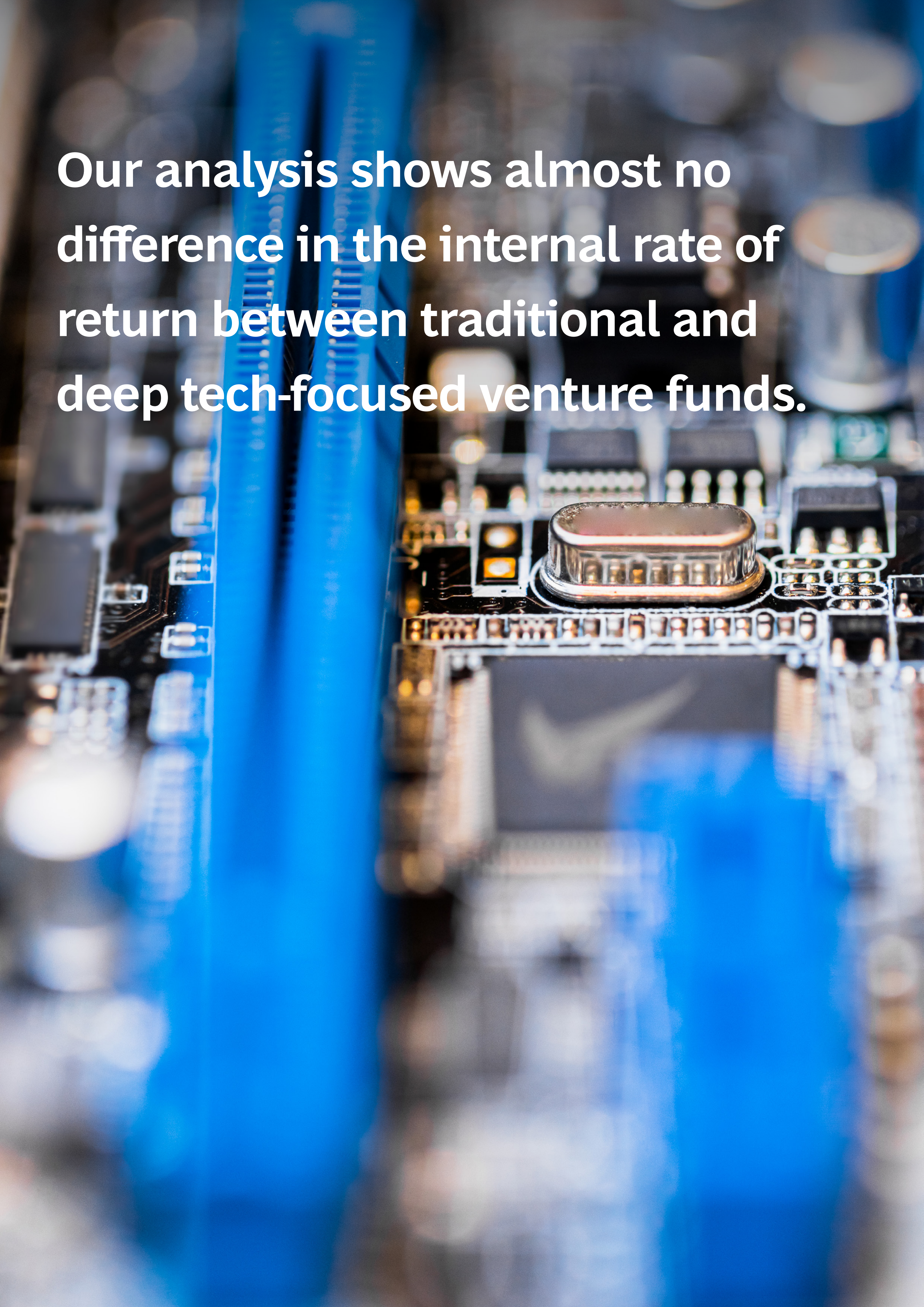
Among Use Cases, Mobility and Digital Cross-Industry Platforms Have Received Almost Half of Deep Tech Investments

Use case	Funding, 2018–2023 (%)[1]	Applications	Sample companies
Mobility and logistics	27	Autonomous vehicles, low-emission vehicles, and maritime propulsion	Cruise and Rivian
Digital cross-industry platforms	21	Generative AI and cognitive platforms	OpenAI
Health and well-being	15	Drug discovery, smart wearables, AI diagnostics, surgery robots, and biologic drugs	CMR Surgical, Exscientia, and Roivant Sciences
Energy and climate	9	Energy production, carbon mitigation and economy, and climate adaptation	Climeworks and TAE Technologies
Physical cross-industry platforms	8	Bioreactors and advanced materials	Gingko Bioworks
Space	7	Nanosatellites, satellite imagery, satellite communications, and zero-gravity manufacturing	Oneweb and Sierra Space
Cybersecurity, DeFi, and legal tech	6	Cybersecurity threat probes and predictions, peer-to-peer lending, and generative AI in legal	Consensys and Dataminr
Agri-food	3	Protein design and production, precision agriculture, and fertilizers	Apeel Sciences and Benson Hill
Defense	1	Airspace security and crime prediction and prevention	Anduril Industries and Knightscope
Other	4	Construction, fashion, media, and education	Improbable and Magic Leap

Sources: Dealroom; BCG analysis.

Note: DeFi = decentralized finance. Because of rounding, percentages don't add up to 100.

[1]Funding for companies that have completed Series B funding and later rounds, accounting for more than 90% of their total funding from the beginning of 2018 through the first half of 2023.



Our analysis shows almost no difference in the internal rate of return between traditional and deep tech-focused venture funds.

Exhibit 7 - Five Types of Deep Tech Investors Are Active at Different Stages

	Genius hunters	**Early-stage investors**	**Growth-focused VC funds**	**Life cycle Investors**	**Bits-only deep tech investors**
	Small funds with strong ties to research institutions and focused on seed investments	Small-to-midsized funds that double down on existing startups within a specific vertical	Funds with high AUM that leverage existing investment capabilities to invest in attractive startups	Large investors that look to make long-term strategic investments in deep tech	Large traditional VC funds that make a few investments in software-only deep tech
Stage	Pre-seed and seed	Seed and Series A	Series B and beyond	Seed through later stages (including growth)	Seed through later stages (including growth)
Investment horizon	3–5 years	3–5 years	5–7 years	7–10 years	3–4 years (may exit after Series B or C funding round closes or continue)
AUM	<$100 million	$100 million to $500 million	$250 million to $1 billion	$1 billion or more	$1 billion or more
Tech focus	One or two areas	Two or three areas	Four or more areas	Four or more areas	One or two areas
Average investment	$1 million to $5 million (deploy ~$25 million per year), often co-invested	$5 million to $25 million (deploy ~$75 million per year)	$25 million to $50 million (deploy ~$125 million per year)	$40 million or more (deploy ~$400 million per year)	$5 million to $50 million (annual investment varies significantly)
Number of funds	>500	>250	>50	>10	Variety of funds making select deep tech deals

Sources: Hello Tomorrow; Preqin; expert interviews; BCG analysis.

Note: AUM = assets under management; VC = venture capital.

Early-Stage Investors. Some 250 small-to-midsized funds around the world, managing $100 million to $500 million each, double down on existing startups within a specific vertical. Their typical investment is $5 million to $25 million, and each also focuses on two to three investment themes (such as AI, climate change, health, and quantum computing).

Growth-Focused Venture Capital Funds. These larger and more diverse funds leverage their existing investment capabilities to invest in attractive startups. They number about 50, with assets under management of $250 million to $1 billion. They focus on Series B or later investments of $25 million to $50 million each and a five-to-seven-year time horizon. They “specialize” more widely across the deep tech landscape, and some are corporate venture capital offshoots of large established companies.

Life Cycle Investors. These large investors—about ten firms around the world managing more than $1 billion each—look to make long-term strategic investments in deep tech. They are active from the seed capital stage through the later stages, focusing on investments of $40 million or more and a lengthy (seven to ten year) time horizon.

Bits-Only Deep Tech Investors. A few, large traditional venture capital funds are making limited investments in software-only deep tech. The funds are typically large (more than $1 billion in assets under management) and their investments range across the life cycle, from small seed deals ($5 million) to large ($50 million) late-stage investments. Their time horizon is usually three to four years.

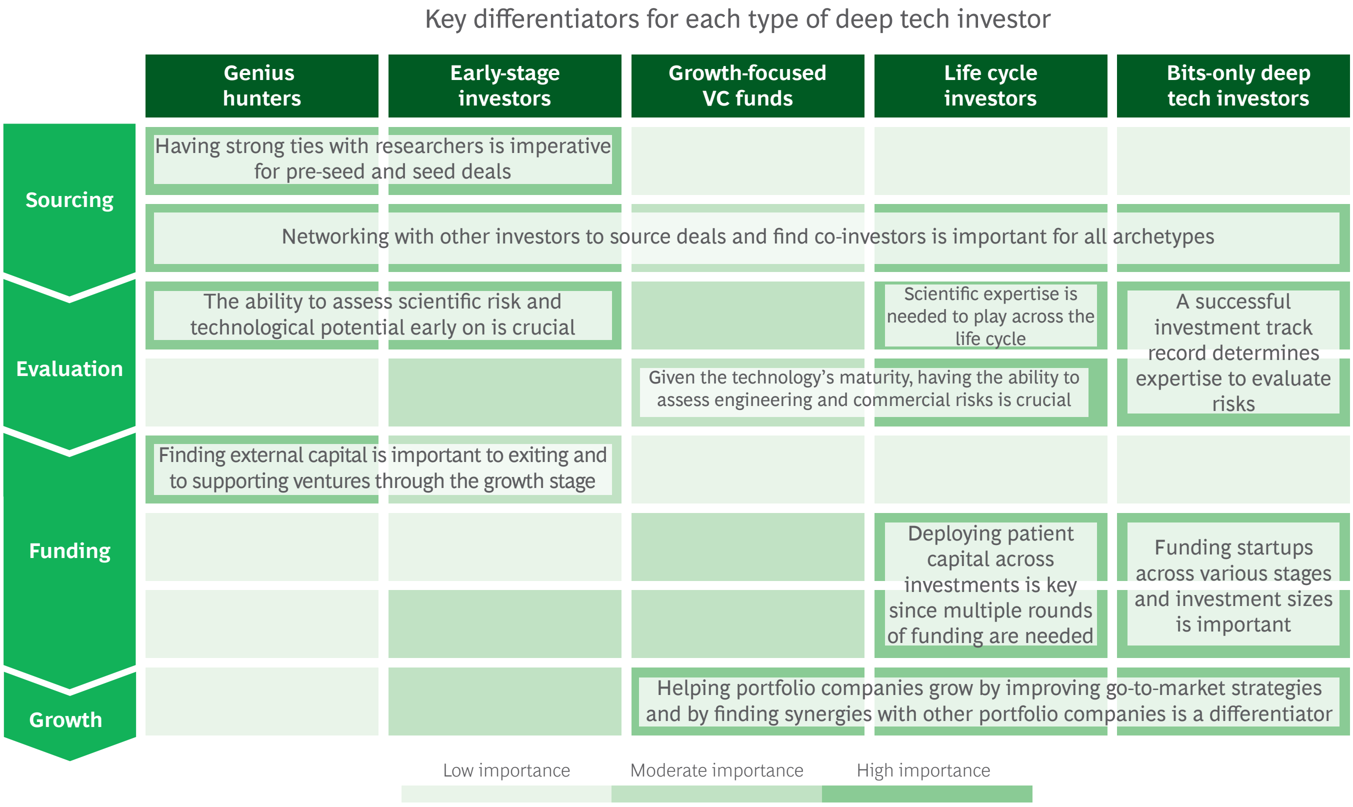
Key Differentiators. Where each of these investors focuses in terms of technology, use case, and life cycle stage determines the capabilities and resources they need to be effective. (See Exhibit 8.) Genius hunters and early-stage investors, for example, have built strong ties with researchers and academia, and they have the ability to assess scientific and technological developments. For example, The Engine was spun out of MIT in 2016 with the purpose of supporting startups that are poised to create a material positive impact on society and the environment. One such startup is Boston Metal, which raised $350 million.

Engineering and commercial risk assessment skills, combined with the ability to deploy patient capital, are differentiating characteristics for later-stage funders, such as growth-focused venture capital and life cycle investors. For instance, Bessemer Venture Partners relies on its large community of operating advisors and balances its investments across the life cycle to build enduring companies. Larger life cycle investors have developed the best practices regarding governance, capabilities, and networks. For example, Temasek has built expertise in certain deep tech verticals over time, engaging its global advisory network for insight into operating as a life cycle investor.

A Clear Strategy and the Right Expertise Are Key

To invest in deep tech, investors need to start with a clear investment strategy that prioritizes the technology segments where they can build networks of expertise and ecosystems of partners. They should start with the problem: Which big issues do they want to address? Which technology segments are best suited to addressing them? For example, Quantonation's fund is dedicated to deep physics and quantum technologies that can address multiple big needs. Breakthrough Energy Ventures focuses on the problem of GHG emissions and seeks to finance, launch, and scale companies using various technologies that will eliminate them.

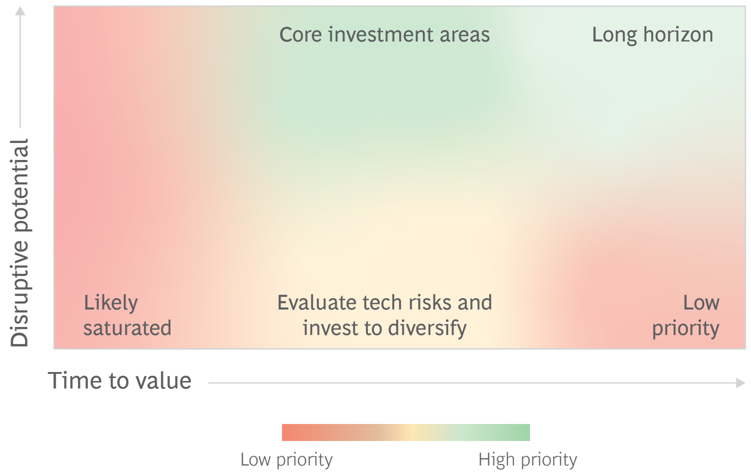
Exhibit 8 - Investors' Focus Determines Which Capabilities and Resources They Need



Sources: Expert interviews; BCG analysis.

Note: VC = venture capital.

Exhibit 9 - Investors Should Strategically Evaluate Deep Tech Investments



Objectives of prioritization

- To identify the core areas in which funds should develop deeper expertise to facilitate investing
- To inform factors in operating model design (for example, governance, capabilities, and networks)
- To identify longer-term opportunities for selective and opportunistic investing

Source: BCG analysis.

Investors can then prioritize segments by considering the following:

- **Disruptive Potential.** Which use cases can the selected technology redefine?
- **Investment Possibilities.** How quickly are startups growing in this area? How full is the pipeline of available investments based on the number of startups in the field and the deals currently being done?
- **Time to Value.** How mature is the technology? What are the remaining technological risks?
- **Existing Capabilities.** Does the fund have the capabilities and resources to leverage in the field? If not, what capabilities does it need to build? What's the level of difficulty?
- **Ecosystem.** What is the level and type of involvement of other players, such as governments and institutions, in the financing of startups? (See the sidebar "The Role of the Other Players.")

This analysis will result in a handful of core investment areas and longer-horizon and diversification opportunities. (See Exhibit 9.) The former are target areas in which to develop deeper expertise and start to assess actual candidates for funding. Funds can selectively and opportunistically invest in the latter to diversify their portfolios and build a long-term technology advantage.

Once a niche for high-risk, high-return bettors, deep tech investing has migrated to the mainstream of venture funding, riding a wave of expanded understanding and appreciation of the opportunities available. Since the problems that deep technologies seek to solve are both large and complex, they are likely to be with us for a long time. The need for advanced technology solutions will only increase, but the playing field of funders will also become more crowded and competitive. This is the time for foresighted investors to make their play in the deep tech game.

The Role of Other Players

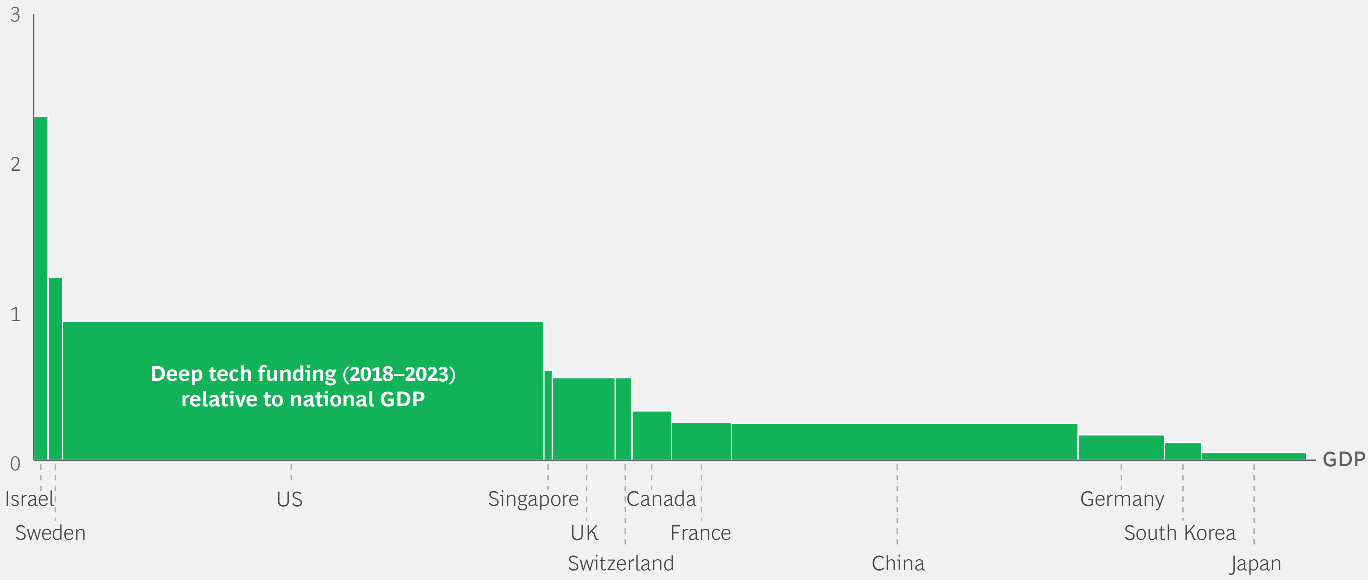
Countries' support of deep tech varies widely. In both the private and public sectors, the support takes many forms and affects the growth and health of supporting ecosystems. The US and China lead the world in absolute share of deep tech funding provided, with more than 60% and 12%, respectively; Europe collectively has 14%. At the same time, our analysis of deep tech funding as a share of GDP shows that several nations—among them Israel, Sweden, the US, Singapore, and the UK—are aggressively trying to support deep tech development. (See the exhibit.) In countries where pension funds are part of the investing infrastructure, they put substantial capital into the market and can be major backers for startup funding. This is one of the reasons why the US's ration of funding to GDP ratio is much larger than Europe's.

Governments also play a critical role in deep tech as policy setters, regulators, and funders. National or regional policies and frameworks can support and subsidize strategic segments' growth, from origin and incubation (which often takes place in academia) to market development. This support can take multiple forms. For example:

- **Policymaking.** Dedicated policy frameworks, including tax incentives, preferential loan conditions and guarantees, and legislation that promotes a national agenda (such as the Inflation Reduction Act of 2022 in the US) help make the business case work for deep technologies. As the first country to authorize synthetic meat (chicken) grown from animal cells, Singapore gave a boost to the development of alternative proteins.

Israel, Sweden, the US, Singapore, the UK, and Switzerland Invest More of Their Wealth in Deep Tech Than Do Other Countries

Deep tech intensity, 2018–2023[1]



Sources: Dealroom; Oxford Economics; BCG analysis.

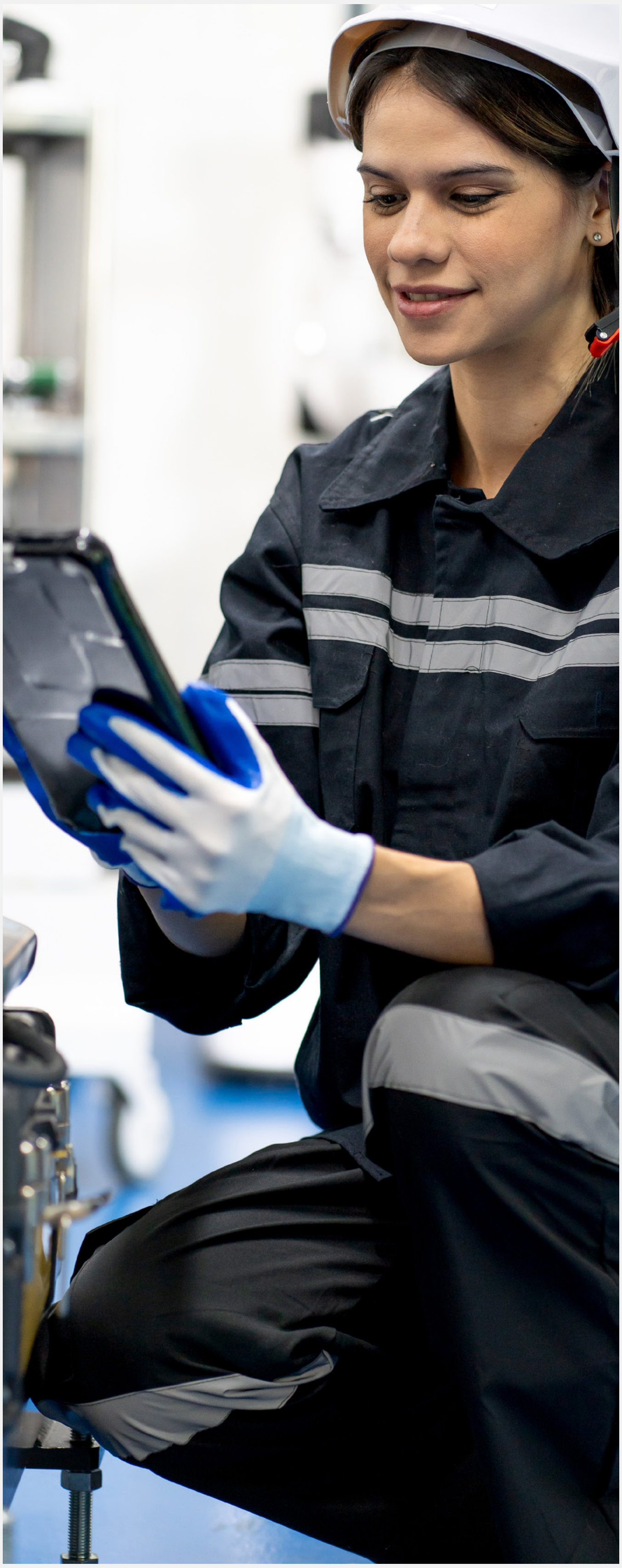
[1]The deep tech intensity for each country was calculated by dividing its deep tech funding by its GDP (normalized US index is 1).

- **Business Facilitation.** Streamlined legal frameworks ease the launch of startups. The dissemination of best-practice information on topics such as patents, technology transfers, and “startup studios” that provide business support help the transition from R&D to business models.

- **Early Customers.** Governments’ interest in developing breakthrough technologies for national security or other purposes makes them natural early customers of deep tech startups. The US Defense Advanced Research Projects Agency funded SpaceX’s first two launches, and a commercial resupply services contract from NASA led to the company’s first Falcon 9 flight.

- **Public Grants.** Government grants and subsidies to research labs, academic institutions, and startups support development of promising technologies. The Israel Innovation Authority aims to stimulate R&D investment from companies by providing financial support of 20% to 50% of approved R&D costs. France established its Deeptech Plan in 2019, and in 2023, it committed to invest $1.3 billion in quantum technologies by 2027. The EU’s Innovation Fund supports ventures developing advanced low-carbon technologies.

- **Education.** Academic institutions are often the birthplaces and early incubators of technological innovation. A focus on deep tech at universities, such as Cambridge and Oxford in the UK, facilitates bridge building among academics, venture capital, and corporations and the development of supporting ecosystems.



About the Authors

Jean-François Bobier is a partner and vice president, deep tech, in the Paris office of Boston Consulting Group. You may contact him by email at bobier.jean-francois@bcg.com.

Anne-Douce Coulin is a senior product manager, deep tech, in the firm's Paris office. You may contact her by email at coulin.anne-douce@bcg.com.

Constant Morez is a partner in BCG's Paris office. You may contact him by email at morez.constant@bcg.com.

Greg Emerson is a managing director and partner in the firm's San Francisco office. You may contact him by email at emerson.greg@bcg.com.

Kaustubh Wagle is a managing director and partner in BCG's Dubai office. You may contact him by email at wagle.kaustubh@bcg.com.

Antoine Gourévitch is a managing director and senior partner in the firm's Paris office. You may contact him by email at gourevitch.antoine@bcg.com.

For Further Contact

If you would like to discuss this report, please contact one of the authors.

Acknowledgments

The authors would like to thank Linus Bergström of BCG, Cassia Naudet-Baulieu of BCG, Lorenzo Chiavarini of Dealroom, and Nico Dehnert of Optiml for their contributions to this article.

Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we work closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organizations to grow, build sustainable competitive advantage, and drive positive societal impact.

Our diverse, global teams bring deep industry and functional expertise and a range of perspectives that question the status quo and spark change. BCG delivers solutions through leading-edge management consulting, technology and design, and corporate and digital ventures. We work in a uniquely collaborative model across the firm and throughout all levels of the client organization, fueled by the goal of helping our clients thrive and enabling them to make the world a better place.

For information or permission to reprint, please contact BCG at permissions@bcg.com. To find the latest BCG content and register to receive e-alerts on this topic or others, please visit bcg.com. Follow Boston Consulting Group on Facebook and X (formerly known as Twitter).

© Boston Consulting Group 2023. All rights reserved. 11/23

bcg.com