



To BCG's network around the world,

I recently asked my colleague Antoine Gourévitch, one of our top emerging-technology experts, to predict which of the exciting new technologies—quantum computing, blockchain, the next generation of AI, synthetic biology, nanotechnology—will be behind the biggest innovations and most important societal solutions through this decade and beyond.

I learned a lot from Antoine's (non)-answer. Rather than placing his bets on any one of these, he is a true believer in the importance of a "deep technology" innovation model, which, as he explained in his recent [TED talk](#), is not about investing in a single technology but leveraging a confluence of technologies and making them more accessible. Deep tech reduces research costs by standardizing new technologies and using data platforms to accelerate the lab-to-market process. The methodology is driven by science, engineering, and design thinking and requires a powerful ecosystem of partners.

In place of the traditional innovation model, where the work takes place in university labs or at large companies, the heart of the deep tech methodology today is in startups—30,000 strong, in fact—which are creating new technology prototypes at an average cost of \$200,000. Deep tech ventures, attracting some of today's most brilliant young scientists, can hold the keys to unlocking the toughest problems we face in areas such as sustainability, energy, nutrition, public health, education, and mobility.

But with such a frenzy of startups out there, what does deep tech really mean for the rest of us?

Unlocking innovation with deep tech offers extraordinary promise, but success requires established companies to embrace new ways of looking at how technology solves problems and new approaches to bringing solutions to market.

**The first step when moving into deep tech is to remember that this is a business game, not a technology game.** Instead of a solution in search of a problem, the deep tech model begins with a complex problem and tackles it systemically using multiple technologies.

Take the powerful example that we all witnessed over the past year as Moderna and the partnership of BioNTech and Pfizer brought two COVID-19 mRNA vaccines from genomic sequence to market in less than a year.

Or look at the joined forces of Bayer and biotech company Gingko Bioworks, which set out to tackle a problem that had seemed intractable: decreasing the carbon emissions involved in nitrogen fertilizer production. Rather than advancing the current model, the new venture, Joyn Bio, is seeking to disrupt the entire system using synthetic biology to enable cereal crops to fix nitrogen onto the roots of plants, mimicking nature.

**The next step is to find the winning technology formula.** Successful investors set up an interdisciplinary team of experts to research the landscape of deep tech ventures and identify the combination of available technologies needed to solve the problem at hand.

We've been working at this at BCG, developing a deep tech platform to provide information about startups and breaking their capabilities down into building blocks that companies should be able to choose from and combine in order to find the right solution

**The third step is to manage the process through a design-build-test-learn (DBTL) engineering cycle.** DBTL connects the problem you're trying to solve with the science and technologies needed to solve it. Identify assumptions to be tested, reducing risk up front; build a working prototype as quickly as possible; anticipate the friction points; and cut back on the costs of testing and learning by using data and digital platforms.

The deep tech investment approach may seem counterintuitive. Big companies have their own R&D departments and may be resistant to reaching out, wary of anything not invented on the inside. But Antoine puts it this way: 2021 is for deep tech what 1995 was for digital. Back then, we certainly didn't know everything that digital would be capable of, but companies suffered if they were slow to explore, experiment, and adapt with emerging digital technologies.

It's still relatively early days in the deep tech wave of business innovation. Instead of playing catch up to own specific technologies, most of us will be better placed to dive into a

thriving deep tech ecosystem to discover new solutions to our toughest problems.

Until next week,

A handwritten signature in dark ink, appearing to read "Rich".

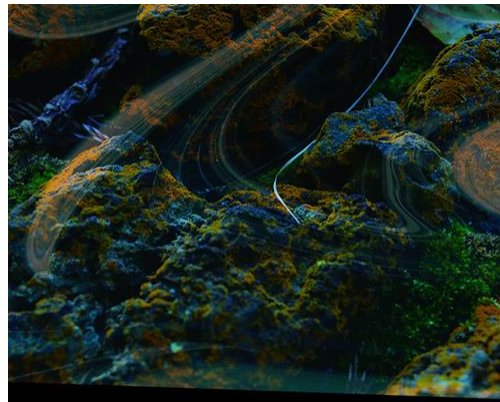
Rich Lesser  
Chief Executive Officer



## Deep Tech and the Great Wave of Innovation

The impact of the next big surge of innovation will be felt everywhere.

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## Looking to Nature for the Next Industrial Revolution

The power of harnessing nature's design principles and manufacturing capabilities is about to become clear.

## How to Unlock Innovation with Deep Tech

Novel technologies promise cutting-edge innovations corporations can't develop alone. But they also demand massive investment and new ways of working with complex ecosystems.