# DEEP TECH

## THE NEW WAVE

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SURFING
TSUNAMIS

*“Deep tech isn’t something that’s out of reach and it’s critical to understand its influence on the development of solutions that can improve the lives of millions in vulnerable situations."*

**Irene Arias Hofman, CEO at IDB Lab**

*“We see world class opportunities in areas that go beyond science such as space, AI and blockchain.”*

**Diego González Bravo, MP at Draper Cygnus**

*“LAC has great scientists and we are working to translate that into world class innovation.”*

**Markus Schreyer, MP at The Ganesha Lab**

*“Deep Tech startups can generate new industries and play a critical role in the development of the region.”*

**Carlos Batthyány, MP at Lab+ & Executive Director of Institut Pasteur de Montevideo**

*“Deep Tech provides opportunities to make the world a better place while achieving attractive returns for investors.”*

**Enrique Duhau, LP & Co-Founder at AIR Capital & Chairman at Administración Enrique Duhau**

*“We invested in dozens of Deep Tech startups and we are only getting started, there is huge growth potential.”*

**Matias Peire, Founder at GridX**

*“LAC startups are achieveing things that people still think are impossible.”*

**Nicolas Tognalli, MP at CITES**

*“We think LAC startups have structural advantages to compete in Deep Tech globaly.”*

**Sebastián Alejandro Tapia, Partner at Deloitte**

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**This report offers an intellectual foundation to understand the evolution of the LAC Deep Tech innovation ecosystem. The report is for information purposes only and should not be relied upon as a basis for investment decisions. Investing in technology startups involves risk and requires expertise, as well as a deep analysis of specific opportunities. All statements made regarding companies are strictly beliefs and points of view held by the authors and are not endorsements or recommendations to buy, sell or hold any security. The authors, sponsors and the IDB Lab may hold positions in the companies discussed in the document.**

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SURFING TSUNAMIS

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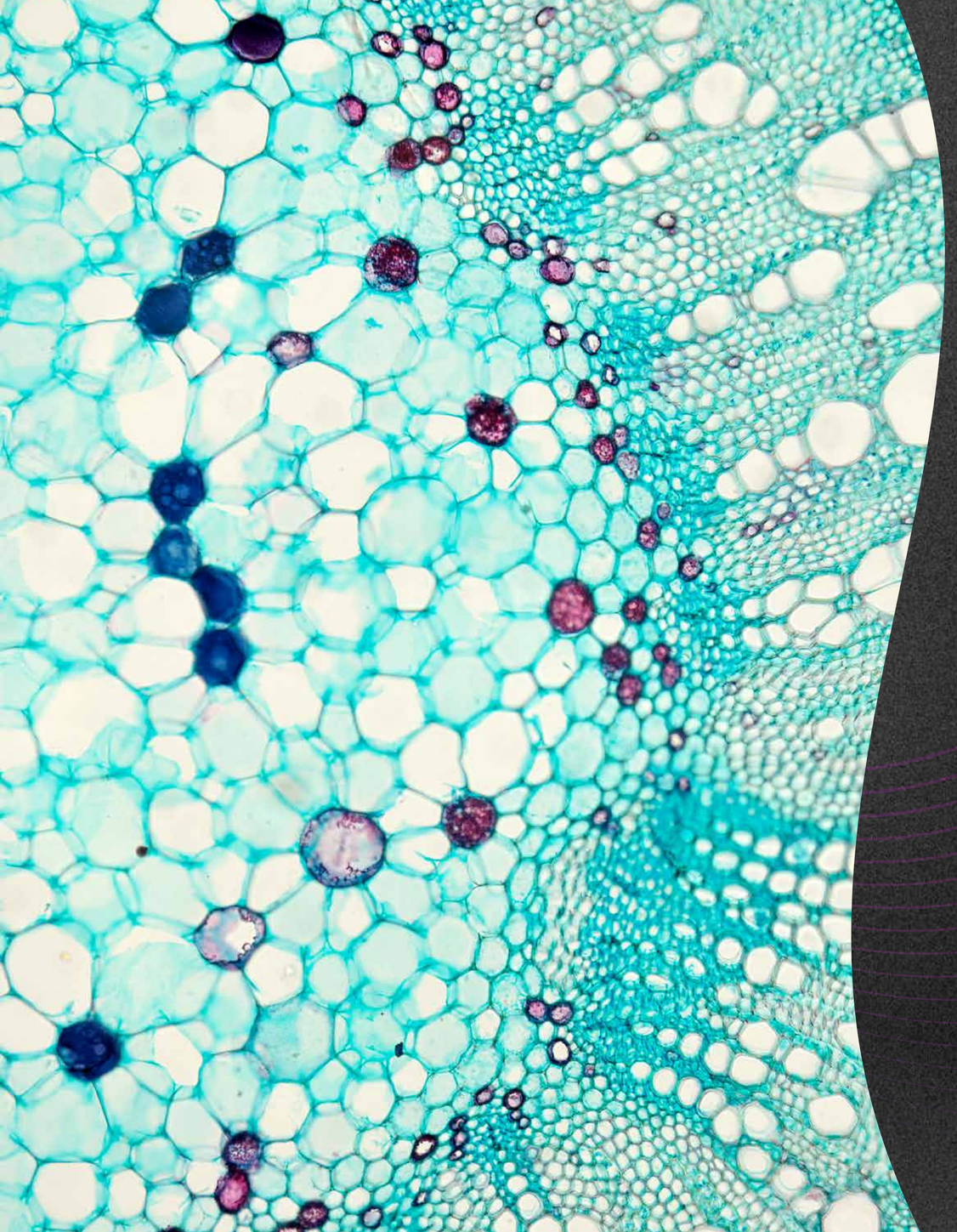


# EXECUTIVE SUMMARY

# The report in numbers

## The LAC Deep Tech ecosystem is taking of

**340**
LAC Deep Tech startups with institutional funding

**15**
Funds and accelerators focused on Deep Tech and based in LAC

**65**
Local and international funds & accelerators investing in Deep Tech in LAC

**14**
LAC countries have Deep Tech startups with institutional funding

## LAC Deep Tech shows significant value creation

**$8B**
LAC's Deep Tech Ecosystem value

**3**
Deep Tech startups worth over $500M

**98**
Deep Tech startups worth over $10M

**$2B**
Capital raised by LAC Deep Tech startups

## Deep Tech startups offer attractive returns

**22-30%**
Net annual return of a leading global venture fund focused on Deep Tech

**$1M**
Current value of $600 invested in Bioceres's first funding round (2001)

**72%**
Gross average return of SOSV's investments in LAC between 2015 and 2023

**44x**
Growth of Deep Tech VC investment in LAC between 2020 and 2022

## LAC talent pool offers a powerfull advantage

**5-10x**
Talent cost advantage of LAC Deep Tech startups

**871K**
People doing STEM R&D in LAC

**10K**
People working in LAC Deep Tech startups

**~5K**
People doing R&D in LAC Deep Tech startups

## Deep Tech can have a powerful impact in LAC

**+100x**
Long-term growth potential for LAC Deep Tech ecosystem

**+4% GDP**
Additional GDP long-term term potential from private R&D

**+7% GDP**
Expected additional GDP from generative AI in the next decade

**+$100B**
Potential additional annual exports of knowledge-based services leveraging AI in 10 years

# We are witnessing a **Big Bang** of Deep Tech innovation

## Robotics
Warehouse robots
Retail robots
Exo-skeletons
Drones
Delivery robots
Humanoid robots
Ocean-floor mining robots

## Spacetech
Small satellites
Nano and pico satellites
Reusable rockets
Satellite mega-constellations
Space-based Internet
Space-based mobile
Space manufacturing
Private space stations
Satellite laser terminals

## Biotechnology
Biomaterials
Cultured meat
Biomanufacturing
Molecular agriculture
Gene-editing software
Advanced genome sequencing
Precision fermentation
Protein folding & design algorithms
CRISPR
Alternative proteins
Genetically modified seeds
Bioprinting
Biosensors

## Blockchain
Web 3.0
Smart contracts
Cryptocurrencies
Digital wallets

*Source: Surfing Tsunamis analysis*

## Advanced mobility
Electric vehicles
Autonomous vehicles
eVTOLs
Hyperloop
Electric planes
Supersonic and hypersonic planes
Earth-to-Earth space travel

## Artificial Intelligence
Large-scale language models
Advanced chalbots
Multi-skilled AI models
Advanced recommendation algorithms
Text-to-Images, Video & Sound
Diffusion models
Autonomous agents

## Cleantech
Advanced wind and solar energy
Advanced batteries
Deep gep-thermal energy
Ultra-High Voltage Transmission
Green hydrogen
Smart grids
Microgrids
Carbon removal technologies
Nuclear fusion
Wireless power beaming

## Nanotechnology
Nanosensors
Nanoparticle-based drug delivery
Nanomaterials
Nanorobots
Nanocapsules

## Infinite computing
Mobile devices
GPUs
Quantum computing
5G-6G
Augmented/virtual reality
Internet of Things
Quantum cummunications
Quantum Internet
Biocomputing
Metaverse
Edge computing
Photonics and optomics

## Advanced materials
Graphene
Synthetic spider silk
Bioplastic
Carbon nanotubes
Superconductors
Photonic crystals
Carbon fiber
Metamaterials

## Healthtech
Messenger RNA vaccines
Patients on chip
AI-driven drug discovery
Brain-computer interfaces
Stem cell therapies
Gene therapies
Robotic surgeries
Regenerative medicine
3D-printed implants
3D-printed organs

## Advanced manufacturing
Industrial robots
Industrial Internet of Things
Digital twins
MEMS
Nanomanufacturing
Laser processing
Advanced 3D printers
- Multi-material
- Metal printers
- Etc.

3D printed construction`

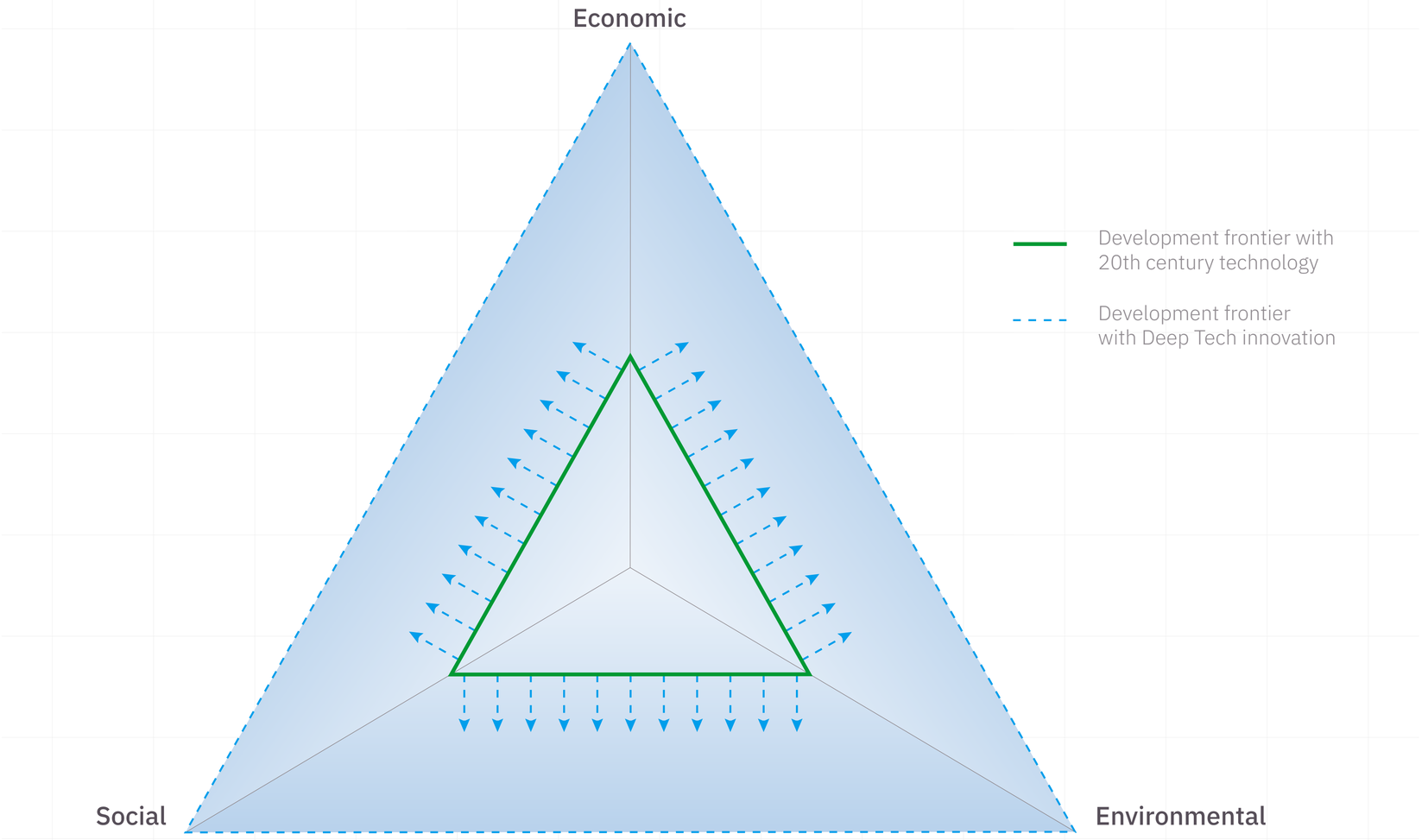
# Deep Tech radically expands the development frontiers

Global factors such as climate change, high debt levels, and aging populations elsewhere will impede LAC's progress within the current technology paradigm. Policymakers face mounting difficulty in achieving a balance between economic growth, social development, and environmental protection.

However, Deep Tech innovation presents an opportunity for LAC countries to bypass traditional development obstacles and unlock unprecedented possibilities. Cutting-edge technologies like AI, solar power, electric vehicles, biotech, advanced manufacturing, and space-based broadband have the potential to pave new paths for economic growth, social equity, and environmental sustainability in the region.

Solar energy is a prime example. Its broad adoption can decrease electricity costs, stimulate economic growth, and create jobs. Socially, it can help bridge the socio-economic divide by supplying electricity to remote and underserved communities, thereby improving their quality of life and enhancing connectivity. Environmentally, transitioning to solar power can substantially lower the region's carbon emissions, a vital step for the climate-vulnerable LAC region. By seizing these and other opportunities presented by Deep Tech, LAC can surmount existing challenges and progress towards a more sustainable and inclusive future.

**Displacement of development frontiers enabled by Deep Tech across major dimensions**




*Source: Surfing Tsunamis analysis*

# LAC startups are developing amazing Deep Tech innovations

Establishment Labs

Breakthrough innovations for breast health, breast aesthetics, and breast reconstruction

Bioceres Crop Solutions

Fully-integrated provider of crop productivity technologies designed to enable the transition of agriculture towards carbon neutrality

NotCo


AI used to make plant-based food that looks, smells and tastes the same as animalbased

STÄMM

Biotech facility down-sized into an all-in-one, plug & play 100x more efficient desktop unit bioreactor

SATELLOGIC

Scalable earth observation platform with the ability to remap the entire planet at highfrequency and high-resolution

Moolec

Real animal proteins but grown in plants used as an alternative to develop food ingredients

puna.bio

Extremophiles used in biological inputs for agriculture to restore soil, increase yields and reduce emissions

FeedVax

Oral vaccines for fish, easy to use, cost effective for the producer, zero stress for the fish, without antibiotics

ZIPPEDI

Robotics and data analytics for retail and consumer goods inventory management

kingo

Distributor of prepaid solar energy service in rural communities without access to the grid

*Sources: Company websites, Surfing Tsunamis analysis*

# Building Deep Tech startups from LAC is easier than ever

Despite skeptics, we view the LAC Deep Tech startup ecosystem as a glass half full, rapidly filling up.

Several LAC-specific factors are catalyzing its growth. These include a burgeoning pool of skilled researchers and engineers, cost arbitrage for technology development, lower early-stage valuations promising high returns, and leveraging LAC's immense biodiversity. An increasingly robust support system, including accelerators, VC funds, university programs, and government policies, further bolsters this growth. Success stories serve as proof of concept, while an emerging replicable LAC Deep Tech business model offers a roadmap for new startups.

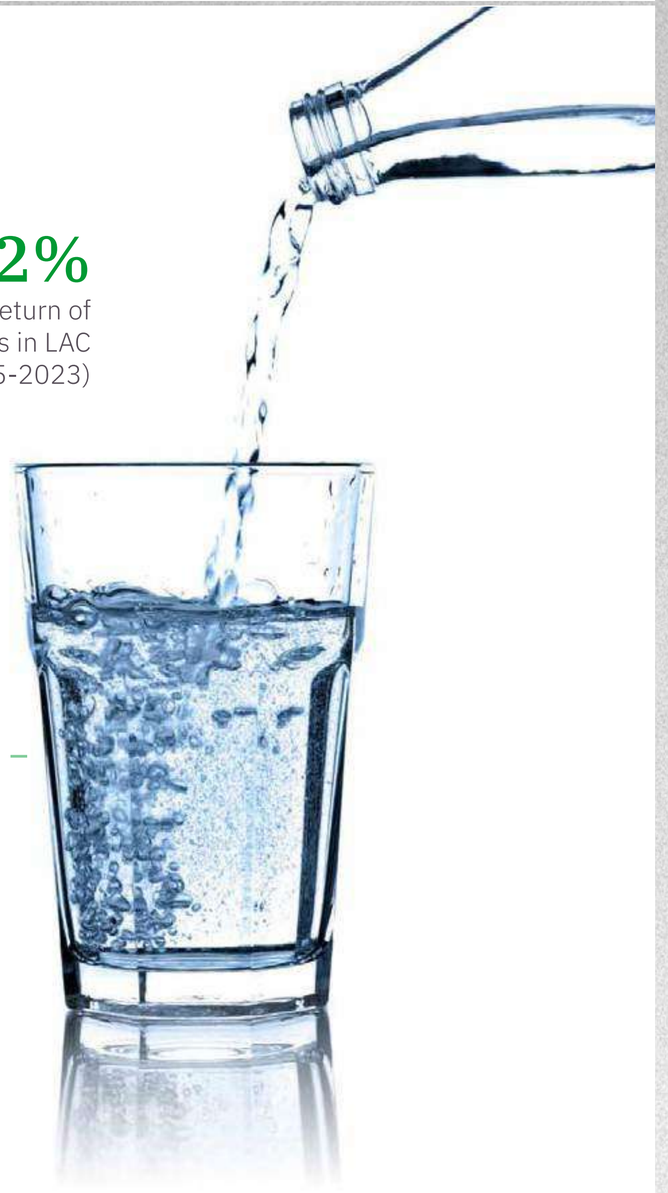
Moreover, creating born-global startups from emerging countries is easier than ever. These startups have access to the same tools and information as their counterparts in developed markets. Faster, more cost-effective innovation cycles and cheaper innovation tools also reduce capital requirements, further dimishing potential disadvantages with startups from other regions.

## The glass is filling up: factors driving the growth of LAC's Deep Tech startup ecosystem

**$1M**
is the current value of $600 invested in the first round of Bioceres in 2001

**72%**
gross average return of SOSV investments in LAC startups (2015-2023)

- Attractive early stage valuations
- Availability of large talent pool
- Lower talent costs than in developed markets
- Growing investor ecosystem
- Opportunity validated by initial success cases
- Emerging LAC Deep Tech business model
- Lower risk due to faster and cheaper innovation cycles
- Opportunity to leverage LAC's biodiversity
- Flat world: new tools enable born-global startups
- Massive opportunities for disruption and value creation



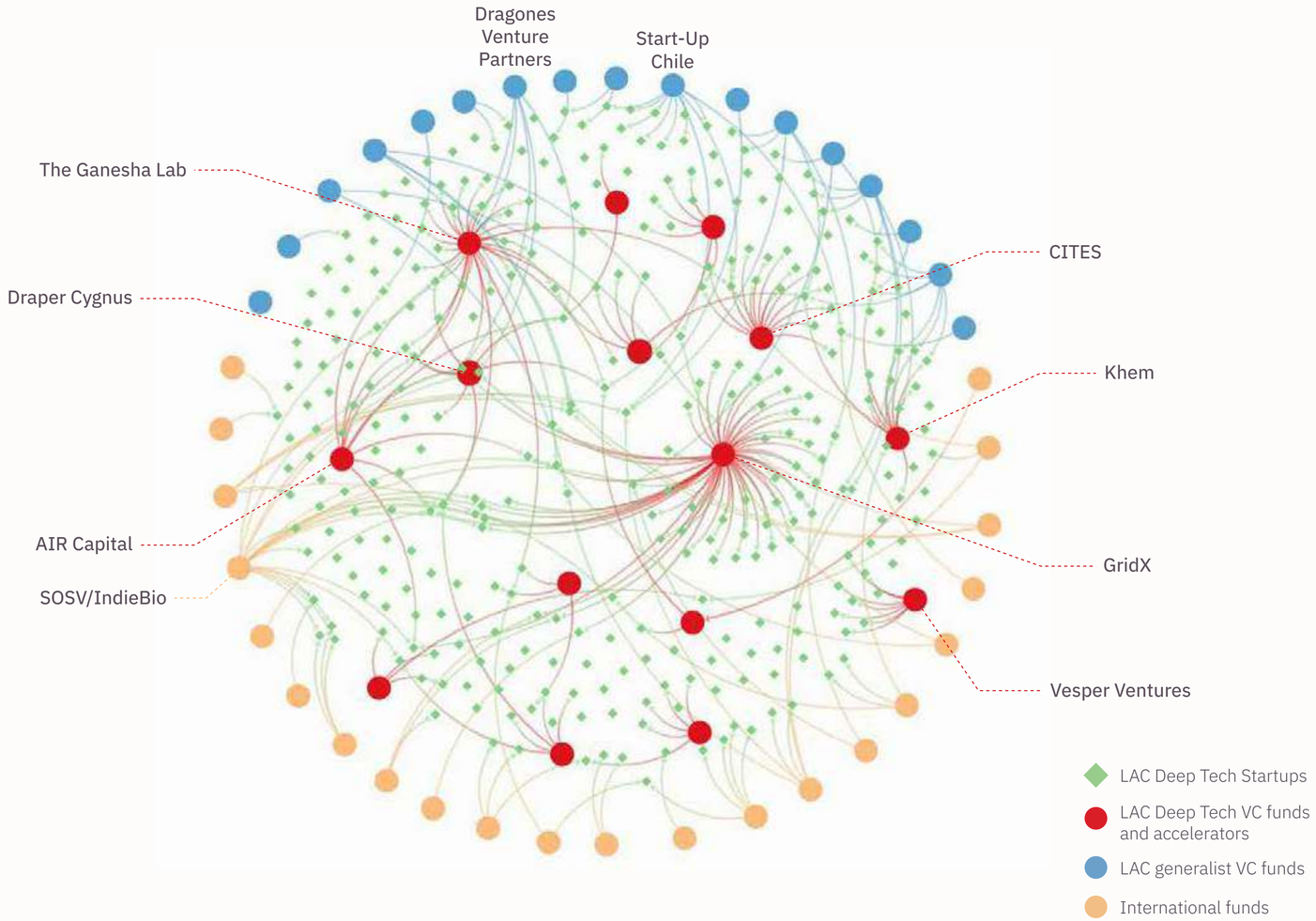
*Source: SOSV, Bioceres, Surfing Tsunamis analysis*

# The ecosystem begins to present a rich network of startups and investors

The graph depicts all investor-backed startups in the ecosystem using small diamonds, represents investors with orange pentagons and maps the connections between them with lines. A cluster of LAC investors focusing on Deep Tech startups are at the center of the graph, playing a vital role in the ecosystem. Notably, two early-stage investors, GridX (with 56 startups) and The Ganesha Lab (with 28), are actively nurturing the ecosystem with a substantial deal pipeline. Other investors, both regional and international, occupy the outer regions of the graph and contribute with a smaller number of investments, but in some cases of higher value.

An exception to this pattern is SOSV/IndieBio, a leading global fund in the biotechnology space. This fund has invested in 30 startups from the region and plays a prominent role in its development. Notably, their significant contribution includes investing in NotCo, one of the most successful startups in the ecosystem that was missed by funds from the region.

## LAC Deep Tech startup and investor ecosystem map




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# The Deep Tech startup revolution has reached 14 LAC countries

Fourteen countries in the Latin America and Caribbean (LAC) region are already the birthplace of investor-backed Deep Tech startups. These countries encompass all the sub-regions of LAC, demonstrating that the Deep Tech opportunity is relevant for the region as a whole.

Argentina, Brazil, and Chile account for the majority of startups (30%, 30%, and 19%, respectively). These countries boast well-developed venture capital ecosystems and harbor a significant concentration of researchers specializing in Deep Tech-related fields. In upcoming years, we anticipate that Mexico and Colombia will gain larger influence and new countries will build ecosystems of their own.

Chile, Brazil, and Argentina also play a central role when it comes to total startup valuation (representing 25%, 23%, and 23% of the aggregated value of startups in the region respectively). But Costa Rica stands out with the fourth most valuable ecosystem, which represents 22% of the ecosystem value in the region, showing that the benefits of the Deep Tech revolution extend beyond larger countries.


*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

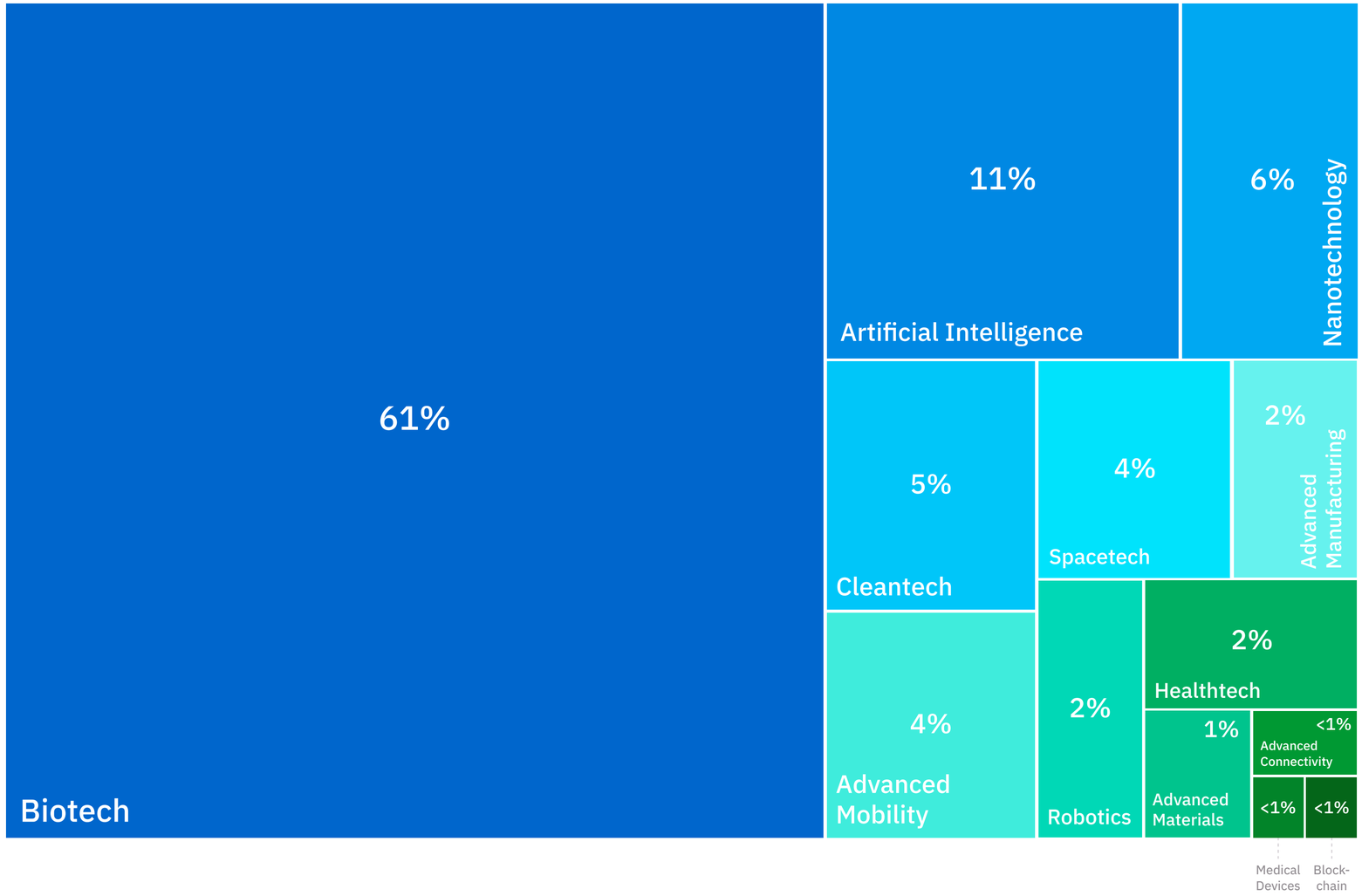
# Biotech and AI concentrate 72% of LAC Deep Tech startups, but other sectors are emerging

Biotech represents the largest share (61%) of Deep Tech startups in the LAC region. The second most active sector is Artificial Intelligence (AI), accounting for 11% of startups engaged in Deep Tech innovation. Here, we specifically refer to startups startups that use AI to address complex challenges, such as developing plant-based alternatives to animal products that are both appealing and nutritious.

Other emerging sectors include nanotechnology (6% of startups), Cleantech (5%), spacetech (4%), advanced mobility (4%), robotics (2%), advanced manufacturing (2%), health tech (2%) advanced materials (1%), medical devices and others (<1%).

Biotech is poised to remain a prominent field due to its connections with food and agriculture, the availability of biodiversity, and the abundance of talented professionals. However, advances and decreasing costs in core platforms such as reusable rockets, AI, self-driving cars, solar panels, and humanoid robotics are expected to foster further growth and diversification across various technologies, by making these technologies more accessible and feasible for startups from LAC countries.

## Percentage of LAC Deep Tech startups by technology sector




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# 24 LAC Deep Tech startups already reached valuations greater than $50M

The most notable Deep Tech success story to date is Auth0, a cybersecurity company that was acquired by Okta from the US for $6.5B in 2021. Given that this company was acquired, we did not include it in our map of the regional ecosystem.

Today, there are 24 companies worth more than $50M in the Latin American and Caribbean (LAC) ecosystem.

The most valuable company in the regional ecosystem is Establishment Labs, a medical device company from Costa Rica listed on NASDAQ, valued at $1.8B. This company is followed by NotCo, a food technology company, and Bioceres, an agricultural biotechnology company, both valued at over $500M.

There are 9 companies in the $100-$500M range and an additional 12 companies in the $50-$100M range. Both Satellogic and Moolec, which are publicly traded companies, have recently seen a significant decrease in their valuations over the past year.

## LAC Deep Tech companies worth over $50M


*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# 20x growth seems viable for next decade for LAC Deep Tech

While LAC's Deep Tech ecosystem has the potential to grow more than a hundredfold in the long term, this expansion will take time. Ecosystems need time to mature, investors and fund managers need to build confidence and improve their skills, support policies require time to be implemented, and an entrepreneurial culture needs to be cultivated.

Over the next decade, our analysis shows there is room for a twentyfold increase in LAC Deep Tech venture capital investments. The number of startups and the value of the ecosystem can follow similar trajectories.

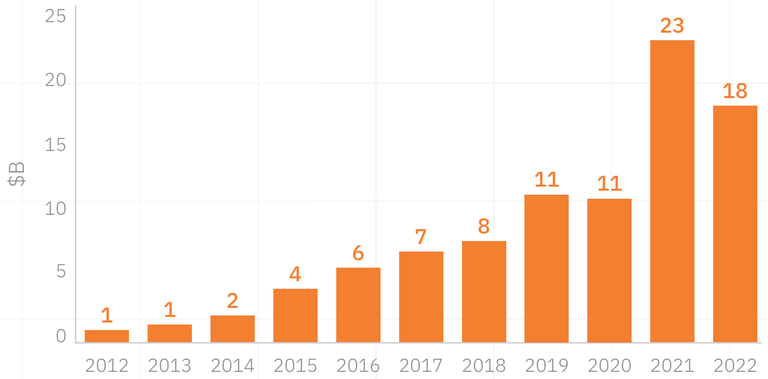
This estimate is based on three supporting trends. Firstly, venture capital investments in European Deep Tech startups grew by 18x over the past decade, from €1B in 2012 to €18B in 2022. Secondly, all venture capital investments in LAC rose from $378 million in 2012 to $7.8 billion in 2022 - or more than 20 times over a decade.

Finally, the trend aligns with the historical progression of Deep Tech investments in LAC. These grew from $96M (0.59% of total LAC venture capital investments) in 2020 to $172M (2.2%) in 2022, showing a solid upward trajectory that would be consistent with a growth of over 18 times over the next decade.

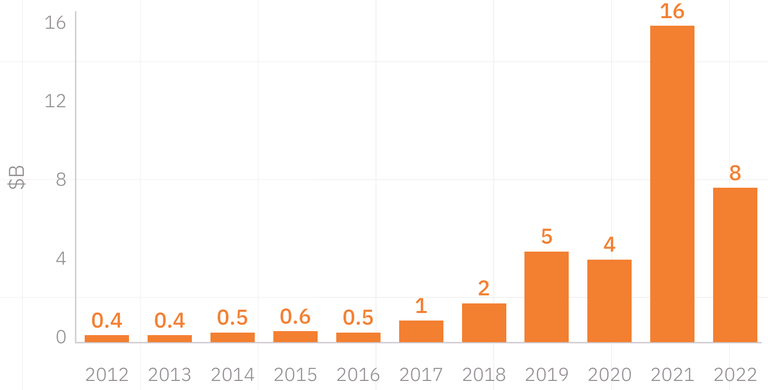
The Deep Tech sector offers great promise for the coming years, especially considering that the convergence of new technologies is only accelerating, creating further potential for growth. Of course, external factors, such as a sustained environment of high interest rates, could impact this potential. However, it is likely that structural factors that may hinder global economic growth will likely drive central banks to maintain lower rate levels once inflation is controlled.

## Analysis of LAC's growth potential over the next decade

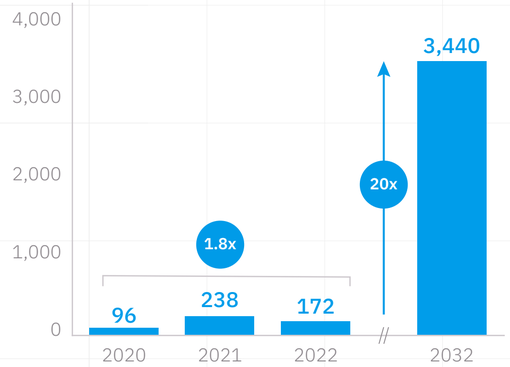
### VC investment in European Deep Tech grew 18x in 10 years




### VC investment in all LAC startups grew 20x in 10 years




### VC investment in LAC Deep Tech can grow 20x over the next decade




*Sources: DealRoom, LAVCA, Surfing Tsunamis analysis*

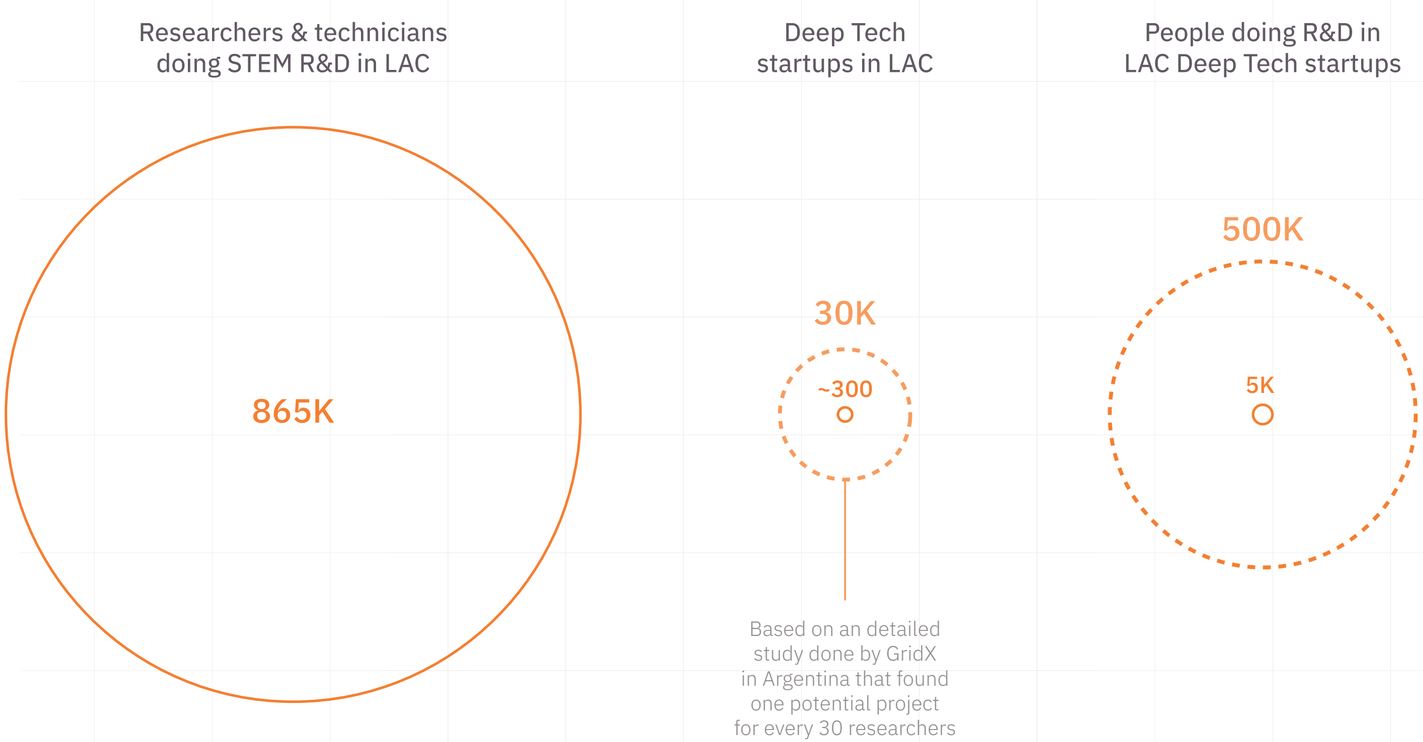
# LAC human capital pool enables 100x growth

Beyond the restrictions imposed by the lack of venture capital availability, the primary constraint to the growth potential of a Deep Tech ecosystem is the availability of qualified R&D talent, and LAC's ecosystem is far from reaching this limit.

Currently, there are approximately 10,000 employees in LAC's Deep Tech startups. As startups grow, they require more personnel in managerial, administrative, commercial, and production roles, reducing the percentage of employees dedicated to R&D. The specific proportion of researchers among these employees is unknown due to data limitations. However, based on our experience investing in the region's Deep Tech startups, we estimate less than half are engaged in R&D. This means that currently less than 1% of the people engaged in R&D in the region is employed by startups.

Even assuming a hundredfold growth in the number of startups and capital raised, there should still be room for expansion. This is particularly true considering the R&D sector itself will likely grow as the ecosystem matures, providing a continually replenishing talent pool.

## Talent pool required for 100x growth




*Sources: GridX, RICYT, Surfing Tsunamis analysis*

# Brazil has the biggest potential for Deep Tech ecosystem growth

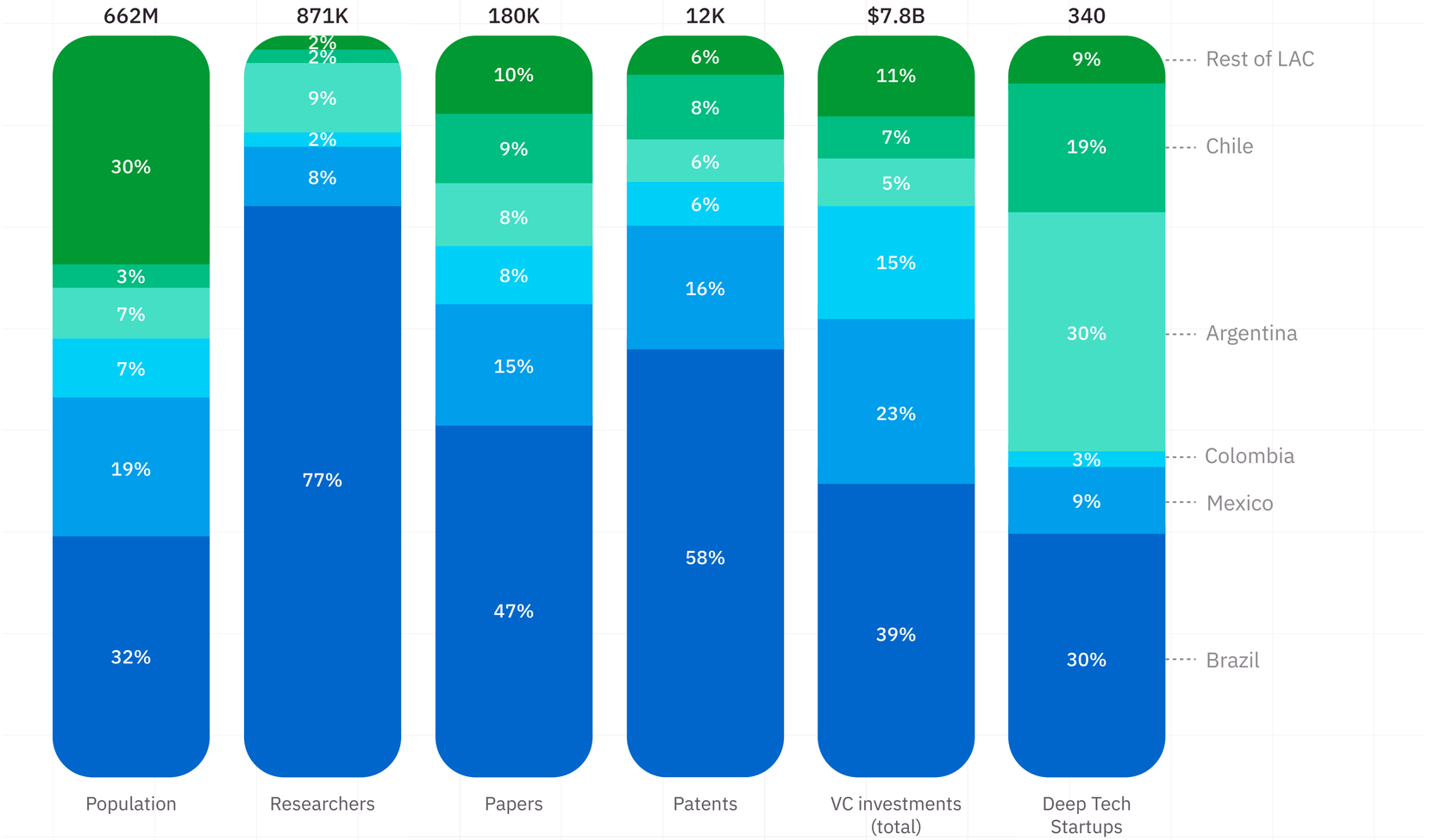
Argentina and Chile emerge as noteworthy pioneers in the regional Deep Tech startup landscape, accounting for 33% and 17% of activity, respectively. However, as other countries begin to realize their full potential, we anticipate a gradual decline in Argentina and Chile's relative share.

Brazil, Mexico, and Colombia, stand out by their untapped potential. While they represent 44% of the startups, they employ 87% of the researchers, contribute to 80% of the patents, and generate 70% of the scientific papers.

Among these countries, Brazil stands out with its substantial number of researchers (77% of LAC), paper contributions (47%), and patents filed (58%), yet it lags behind with only 33% of the startups. This discrepancy may be attributed, in part, to the digital startup model prevalent Brazil, which is focused onthe local market and requires a different mindset compared to the global nature of Deep Tech. But it is hard to imagine this problem will not be solved over time.

The untapped opportunity in the rest of LAC is also significant. Startup activity in the rest of LAC (7% of LAC) falls below the number of scientific papers published (10%), but the biggest opportunity in these countries lies in bridging the gap between the number of researchers (2%) and the population they represent (30%).

## Population, researchers, papers and patents per country in LAC




*Sources: WIPO, LAFCA, World Bank, RICYT, Surfing Tsunamis analysis*

# An integrated approach is needed to unlock Deep Tech potential

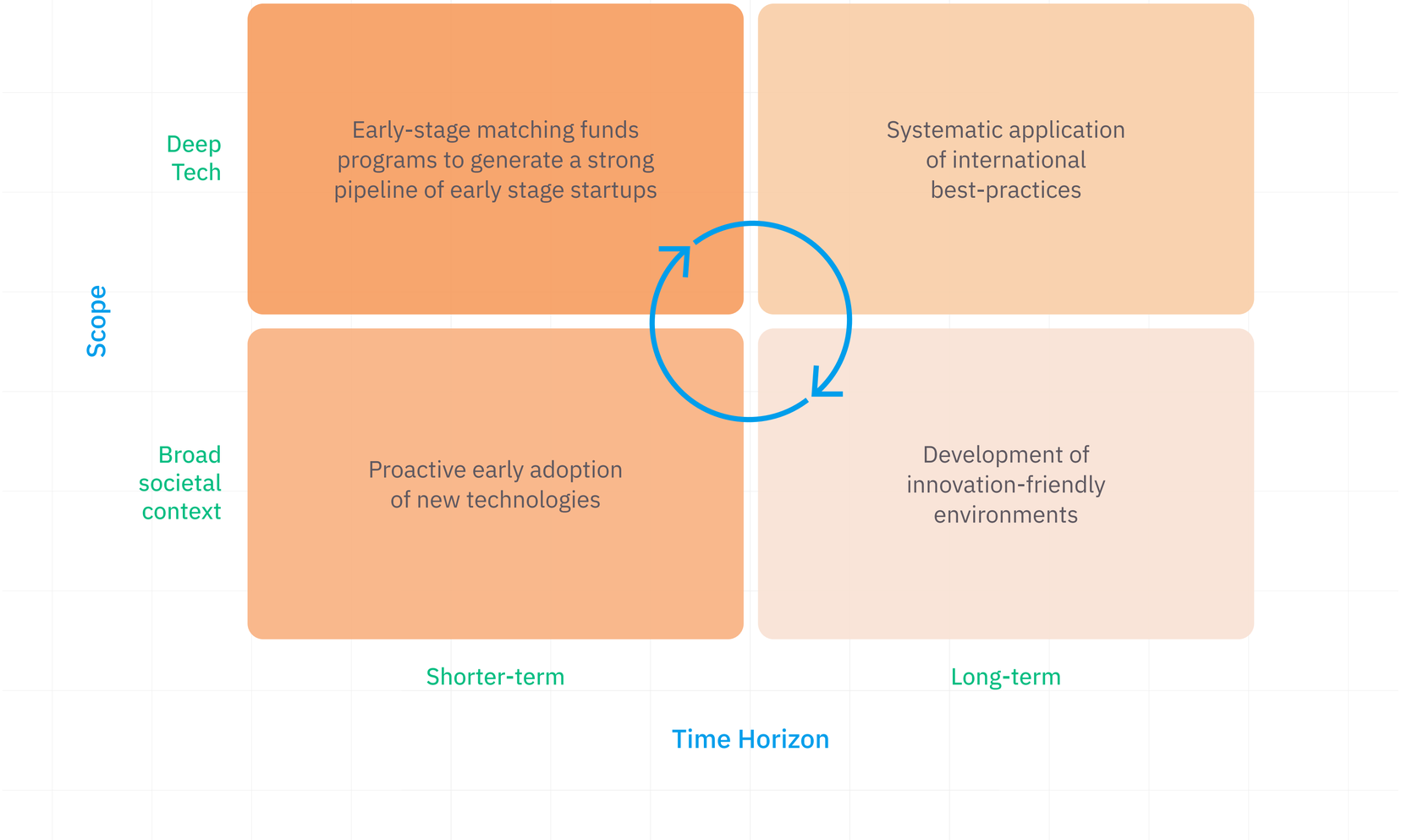
To unlock the full potential of the Deep Tech revolution, LAC must adopt an integrated approach that tackles both short-term and long-term challenges, and addresses broader societal and Deep Tech ecosystem issues, ultimately creating a virtuous cycle of transformation. The most immediate ways to achieve impact are to accelerate the adoption of new technologies and to establish matching fund programs that generate a robust pipeline of early-stage startups.

To achieve even greater success, the region can leverage best practices for developing Deep Tech ecosystems. For this purpose, we have developed a playbook highlighting key initiatives, based on international and regional experiences, which we present below.

Finally, the region must work towards improving its institutional environment, by addressing corruption, which is essential for good policymaking, and focusing on the broader pillars of institutions, infrastructure, and market environment.

In the remaining part of this chapter, we delve into most of these levers in more detail.

## Main challenges to unlock the full potential of Deep Tech in LAC




*Sources: GridX, RICYT, Surfing Tsunamis analysis*

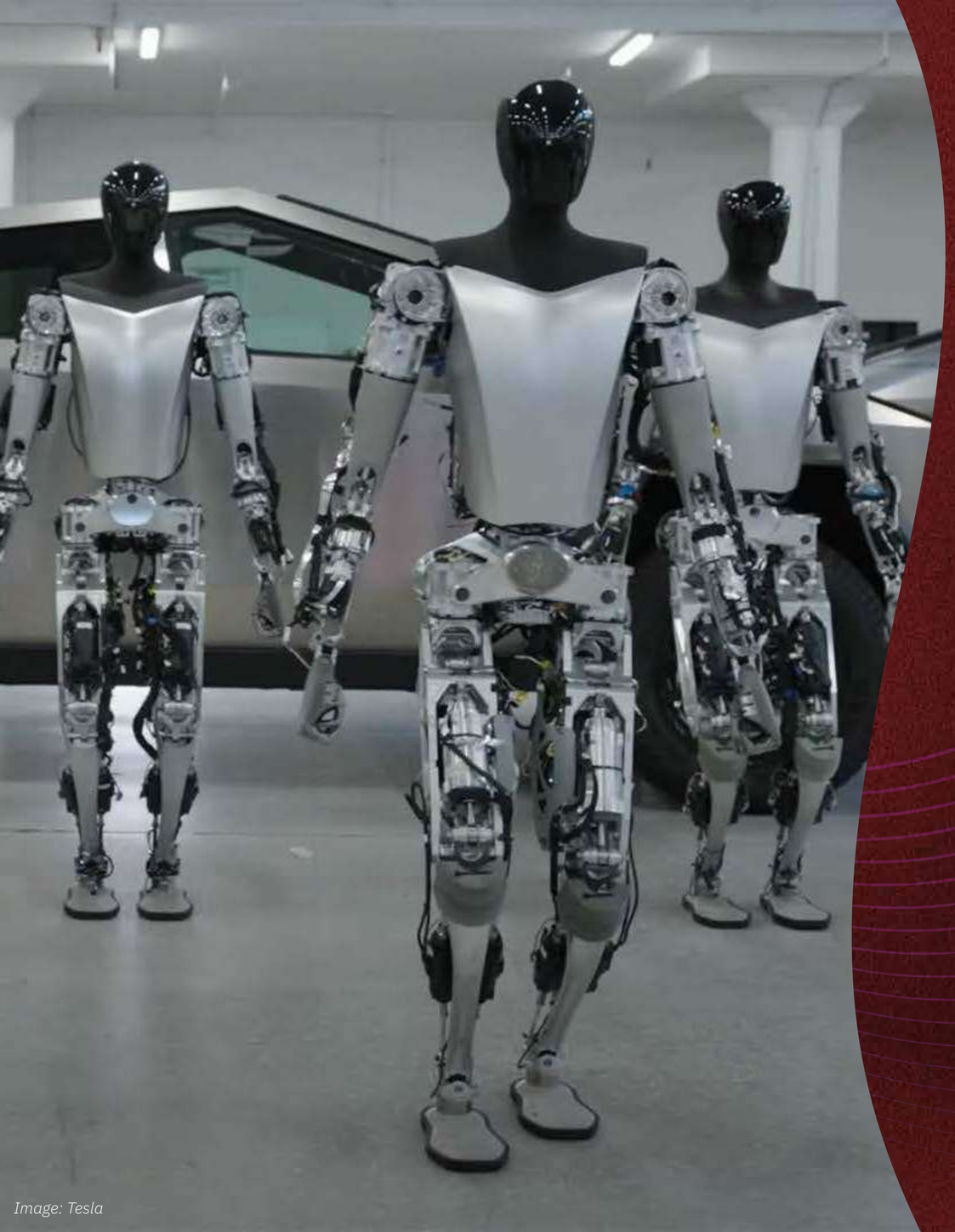


*Image: Tesla*

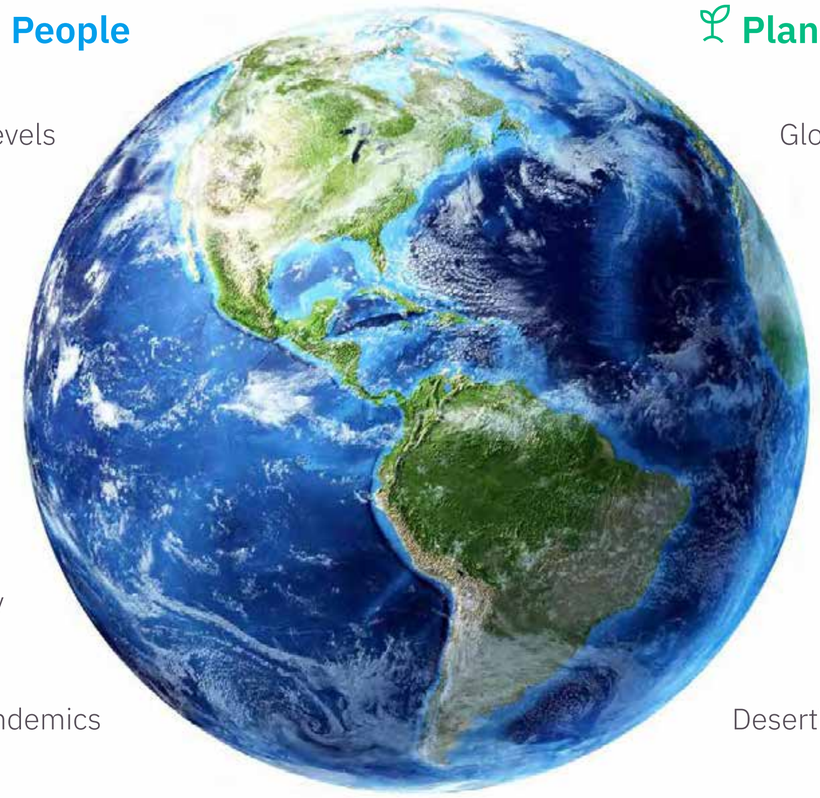
**Chapter 1**

# DEEP TECH WILL TRANSFORM THE WORLD

# We need rapidly scalable solutions for our world's grand challenges

**People**

- Unprecedented debt levels
- Aging population
- Geopolitical tensions
- Financial and banking crises
- Growing income inequality
- Risk of new pandemics



**Planet**

- Global warming
- Extreme weather events
- Deforestation
- Loss in biodiversity
- Ocean fish stock depletion
- Desertification

**70%**

of adults around the world think their children will be worse off

**$23T**

is the estimated annual cost of climate change by 2050

**1M**

species at risk of extinction

*Sources: The Economist, NY Times, Pew Research, UN, New York Times, Swiss Re, Surfing Tsunamis analysis*

# Structural factors will drag global economic growth

Sustained and inclusive global economic growth is crucial to enhancing the quality of life for an expanding population, particularly those most in need. But the formidable obstacles of surging global debt, aging populations in major economies, and climate change loom large, posing substantial challenges to future economic prosperity.

The medium term outlook for the global economy looks bleak. A recent global survey by Pew Research reveals that 70% of adults anticipate a decline in their children's prospects.

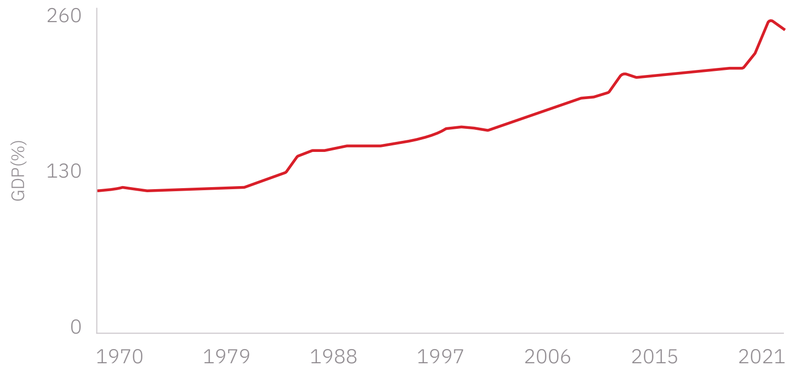
Global debt has reached an unprecedented 247% of GDP in 2021, scaling new heights during peacetime, and most developed economies grapple with the aging of their populations, exerting mounting pressure on government budgets.

Large economies are poised to confront a collapse in their working-age populations. In Europe, the working-age segment peaked at 502 million in 2010 and is projected to plummet to 317 million by 2100 (63% of the peak). Japan faces a graver situation, with its peak of 87 million in 1994 dwindling to 73 million today, and forecasts anticipate a further decline to 37 million by 2100 (42% of the peak). China follows a similar trajectory: the working-age population stood at 998 million in 2015, but is projected to dwindle to 378 million by 2100 (38% of the peak).

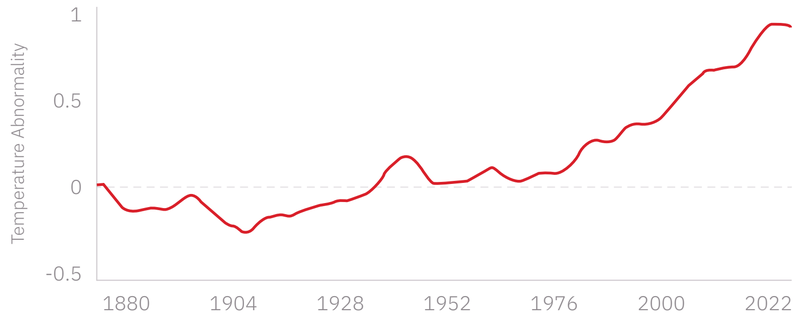
Emissions continue to drive global warming. Throughout the 20th and 21st centuries, atmospheric CO2 levels have escalated by 40%, surpassing concentrations unseen in at least 2 million years. The rise in global mean temperature relative to 1850-1900 has already exceeded 1°C, and scientists caution that we are perilously close to breaching the 2°C threshold. The consequences will encompass far-reaching economic, social, and environmental burdens.

## Examples of structural factors that can drag global growth

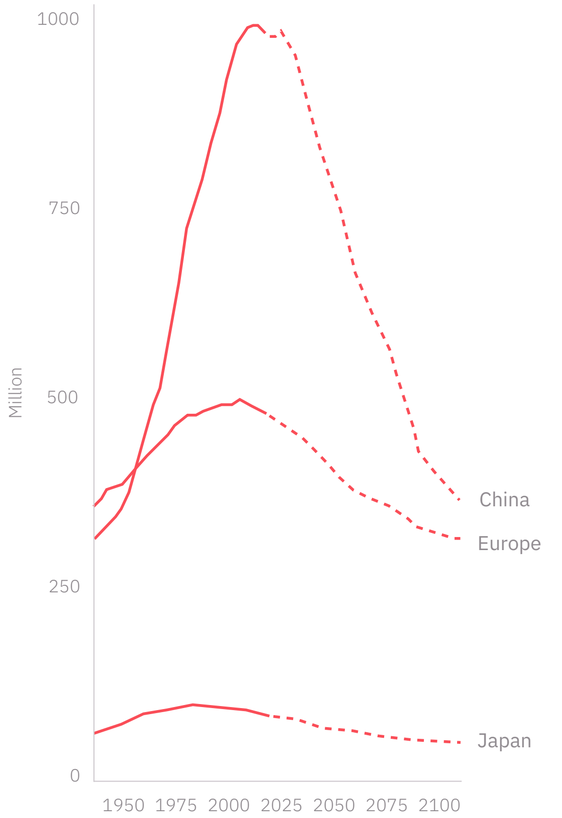
Global debt as a percentage of GDP




Global land-ocean temperature index




Working age population are in major economies




*Sources: IMF, Our World in Data, UK Met Office, Surfing Tsunamis analysis*

# Improving lives at scale **requires radical innovation.**

By 2030, humans will need:

2 Earths

to sustain our current standard of living

5 Earths

for everyone to enjoy the US standard of living

**>10x**

is the magnitud of improvement required in the global production systems to improve standards of living, accommodate a growing global population while reverting environmental degradation

## Deep Tech is needed.

*Sources: Global Footprint Network, Surfing Tsunamis analysis*

# Sustainable development requires Deep Tech innovation

When we contrast the massive challenges we mentioned above with basic development goals such as achieving no poverty, zero hunger and providing quality education for everyone, it is easy to see than any ambitious economic development agenda requires breakthrough solutions.

It is crucial to recognize that concurrently addressing the substantial challenges facing both humanity and the planet demands radical innovation. The challenges we encounter concerning people and the planet are deeply ingrained, intricate, and interconnected. Traditional approaches and incremental advancements fall short in addressing the magnitude of global issues such as poverty, inequality, climate change, and resource depletion.

Consider for instance the challenge of combating climate change. It demands not only incremental improvements to existing fossil fuel energy sources but also the invention and widespread adoption of new, clean technologies capable of significantly reducing greenhouse gas emissions while concurrently lowering the cost of energy.

What we truly need are transformative human-centered solutions that propel us towards a more sustainable and equitable future. This can only be achieved by embracing Deep Tech innovation and fostering paradigmatic shifts in our major production systems.

## Example: UN Development Goals require radical Deep Tech innovation


*Sources: UN, Surfing Tsunamis analysis*

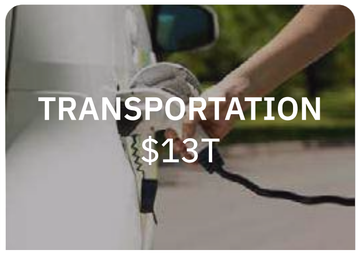
# Deep Tech can enable us to transform the economy

Deep Tech innovation enables us to significantly reducing the cost of essential human needs while minimizing our environmental impact.

Let's explore some illustrative examples. Energy, a crucial catalyst for economic development, represents a market worth $12 trillion. Solar panels emerged as the most cost-effective energy source in human history. They not only create 10 times more jobs per dollar invested compared to fossil fuels but also produce 13-16 times fewer emissions than natural gas. Learning curves indicate that costs should decrease by 75% within the next decade. Furthermore, groundbreaking advancements like flexible perovskite panels, developed by prestigious institutions such as MIT and Stanford, have the potential to reduce costs by up to 10 times compared to current levels.

The demand for affordable and nutritious food is another fundamental need that drives a global market valued at $12 trillion. Biotechnology solutions, such as precision fermentation and cultured meat, hold the potential to lower costs by 5-10 times, reducing production times by 10-20 times, and decreasing emissions by 10 times, all while utilizing 10-100 times less land and water resources.

Clean and affordable transportation can also become a reality through the implementation of electric autonomous vehicles. Industry leaders like Tesla, Baidu, Mobileye, and Cruise are actively deploying and refining this technology, which has the potential to save 4 million lives annually by reducing pollution and accidents while cutting emissions by 5-10 times. Moreover, the impact on productivity is projected to be unprecedented, with Ark Invest estimating a potential $26 trillion boost to the global economy by 2030.

| |  |  |  |
|---|---|---|---|
| Enabling technologies | Solar energy | Precision fermentation and cultured meat | Electric autonomous vehicles |
| Impact on people | **5-10x** lower cost<br>**+10x** more jobs per GWh installed | **5-10x** lower cost<br>**10-20x** faster | **$26T** increase in GDP by 2030 (including time saved)<br>**4M** lives saved annually |
| Impact on planet | **13-16x** lower lifetime emissions than fossil fuels | **100x** lower land requirement<br>**+10x** water efficient | **5-10x** lifetime emissions reduction |

*Sources: RethinkX, UK Energy Research Center, Carbon Brief, ARK Invest, Our World in Data, Center for Disease Control and Prevention, McKinsey, International Energy Agency, Union Concerned Scientists, Surfing Tsunamis analysis*

# What is Deep Tech?

The term Deep Tech was coined in 2014 by Swati Chaturvedi, from Propel(X), who defined it as follows: *"Deep technology companies are built on tangible scientific discoveries or engineering innovations. They are trying to solve big issues that really affect the world around them. For example, a new medical device or technique fighting cancer, data analytics to help farmers grow more food, or a clean energy solution trying to lessen the human impact on climate change."*

Around 90% of startups in LAC (Latin America and the Caribbean) focus on the upper layers of the technology stack. For instance, while a LAC startup may focus on developing an E-Commerce or Fintech app for the App Store, Deep Tech companies like Apple are busy developing groundbreaking devices such as the iPhone.

While traditional digital startups focus on product or business model innovation at higher levels of the technology stack, Deep Tech startups venture further into the technology stack and have to tackle significant technology risks. They operate at the cutting edge of various fields such as biotech, artificial intelligence, robotics, blockchain, advanced material science, photonics, electronics, and quantum computing.

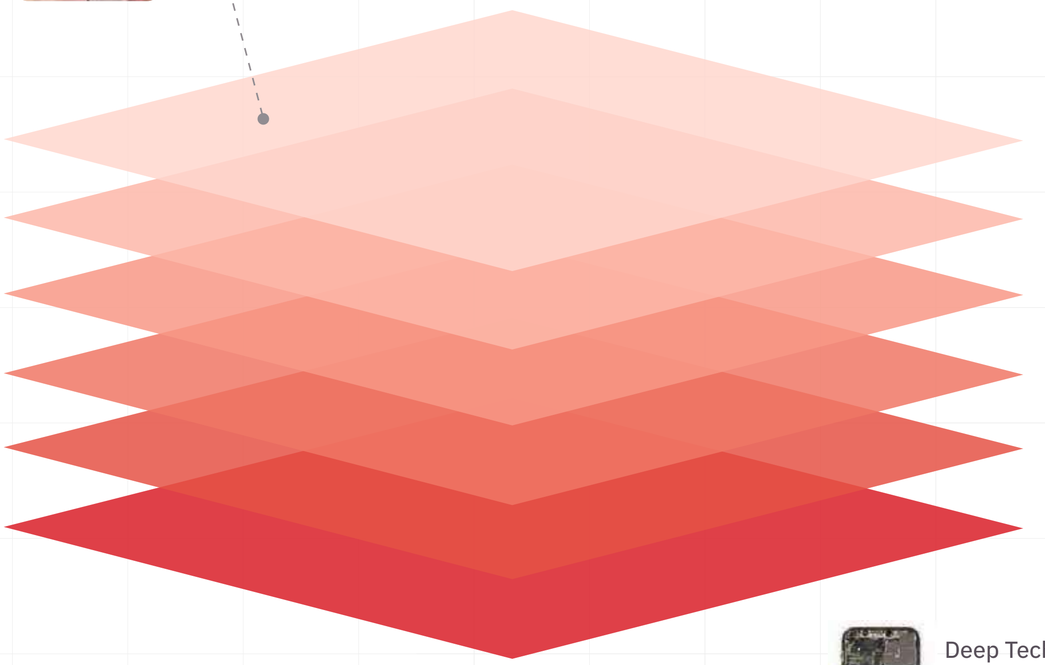
Deep Tech involves substantial research and development efforts, often leading to profound enabling capabilities and significant differentiation. These companies have the potential to catalyze change, establish new industries, and disrupt existing ones.

## Comparison of a traditional LAC startup vs. a Deep Tech company

Example: Smartphone technology stack

Over 90% LAC startups are **focused on the top** of the technology stack

Example: A LAC startup developing an E-Commerce App




Deep Tech companies **go deeper** into the technology stack

Example: Apple developing the iPhone

*Sources: Swati Chaturvedi, Surfing Tsunamis analysis*

# We are witnessing a **Big Bang** of Deep Tech innovation

## Robotics
Warehouse robots
Retail robots
Exo-skeletons
Drones
Delivery robots
Humanoid robots
Ocean-floor mining robots

## Spacetech
Small satellites
Nano and pico satellites
Reusable rockets
Satellite mega-constellations
Space-based Internet
Space-based mobile
Space manufacturing
Private space stations
Satellite laser terminals

## Biotechnology
Biomaterials
Cultured meat
Biomanufacturing
Molecular agriculture
Gene-editing software
Advanced genome sequencing
Precision fermentation
Protein folding & design algorithms
CRISPR
Alternative proteins
Genetically modified seeds
Bioprinting
Biosensors

## Blockchain
Web 3.0
Smart contracts
Cryptocurrencies
Digital wallets

*Source: Surfing Tsunamis analysis*

## Advanced mobility
Electric vehicles
Autonomous vehicles
eVTOLs
Hyperloop
Electric planes
Supersonic and hypersonic planes
Earth-to-Earth space travel

## Artificial Intelligence
Large-scale language models
Advanced chalbots
Multi-skilled AI models
Advanced recommendation algorithms
Text-to-Images, Video & Sound
Diffusion models
Autonomous agents

## Cleantech
Advanced wind and solar energy
Advanced batteries
Deep gep-thermal energy
Ultra-High Voltage Transmission
Green hydrogen
Smart grids
Microgrids
Carbon removal technologies
Nuclear fusion
Wireless power beaming

## Nanotechnology
Nanosensors
Nanoparticle-based drug delivery
Nanomaterials
Nanorobots
Nanocapsules

## Infinite computing
Mobile devices
GPUs
Quantum computing
5G-6G
Augmented/virtual reality
Internet of Things
Quantum cummunications
Quantum Internet
Biocomputing
Metaverse
Edge computing
Photonics and optomics

## Advanced materials
Graphene
Synthetic spider silk
Bioplastic
Carbon nanotubes
Superconductors
Photonic crystals
Carbon fiber
Metamaterials

## Healthtech
Messenger RNA vaccines
Patients on chip
AI-driven drug discovery
Brain-computer interfaces
Stem cell therapies
Gene therapies
Robotic surgeries
Regenerative medicine
3D-printed implants
3D-printed organs

## Advanced manufacturing
Industrial robots
Industrial Internet of Things
Digital twins
MEMS
Nanomanufacturing
Laser processing
Advanced 3D printers
- Multi-material
- Metal printers
- Etc.

3D printed construction`

# We are witnessing a **Big Bang** of Deep Tech innovation

The world is in dire need of radical innovation. Fortunately, the Deep Tech revolution is already underway. We find ourselves at the initial stages of the most disruptive technological revolution in history, witnessing an unprecedented surge of new technologies in various domains such as AI, quantum computing, synthetic biology, electric vehicles, solar cells, batteries, brain-computer interfaces, augmented reality, autonomous vehicles, mRNA vaccines, Low Earth Orbit (LEO) satellite mega-constellations, reusable rockets, humanoid robots, and blockchain.

While many of these technologies have been in development for decades, they have now reached inflection points in terms of cost and functionality, paving the way for accelerated mass adoption. For instance, Artificial Intelligence, once confined to university labs, has rapidly progressed in recent years, with the deployment of deep learning models in areas like search engines, e-commerce recommendation systems, and face recognition. Furthermore, game-changing AI platforms such as OpenAI's ChatGPT and GPT-4, MidJourney, Stable Diffusion, and similar products from Microsoft, Adobe, and NVIDIA have emerged, accompanied by a plethora of open-source autonomous agents like AutoGPT, taking the AI revolution to new heights.

The convergence of these technologies is driving the development of innovative solutions and further accelerating the pace of innovation cycles. The speed at which these platforms are being adopted is unprecedented, with ChatGPT amassing its first 100 million users in just two months, outpacing the growth of Instagram by 15 times and Uber by 35 times. Similarly, open-source autonomous agents based on GPT-4 have swiftly emerged only a few weeks after the launch of the product, exemplifying the rapid progress.

We are swiftly transitioning into a world where science fiction becomes reality, disrupting all industries on an immense scale. The implications of this revolution will be vast, requiring individuals to step out of their comfort zones and adapt to the changes.

While some may seek to slow down or halt this rate of change, it is crucial to acknowledge that the Deep Tech revolution is inevitable. Attempts to impede it in one geographic area, such as the West, will only result in an advantage for other regions. More importantly, we need to avoid the negative consequences of delaying the adoption of these technologies. Our goal should be to harness them wisely to enhance lives, restore the environment and build a better future.

In the previous page, we present a map outlining some of the most powerful technologies emerging from Deep Tech innovation. Behind each technology, numerous startups from around the world are competing to improve our lives and heal the planet.

*Sources: The Economic Times, Surfing Tsunamis analysis*

# Consider recent events...

**Nuclear fusion** ignition has been achieved, US Government announces

Figure promises to launch **first general purpose humanoid robot** in 2023

**Quantum-centric supercomputers** to soon be a reality: IBM's Dario Gil

BioNTech says it will start **cancer vaccine** trials in the UK

Neuralink's upgraded **brain chip** hopes to **help the blind see and the paralyzed walk**

SpaceX does first orbital attempt of Starship and opens **a new space era**

OpenAI announces **GPT-4,** claims it can beat 90% of humans on the SAT

Scientists have reached a key milestone in learning how to **reverse aging**

*Sources: IEEE, Time, CNET, CNBC, LiveMint, Vice, Center of Disease Control and Prevention, Hart, OpenAI, Lawrence Livermore National Laboratory, Loizos, Surfing Tsunamis analysis*

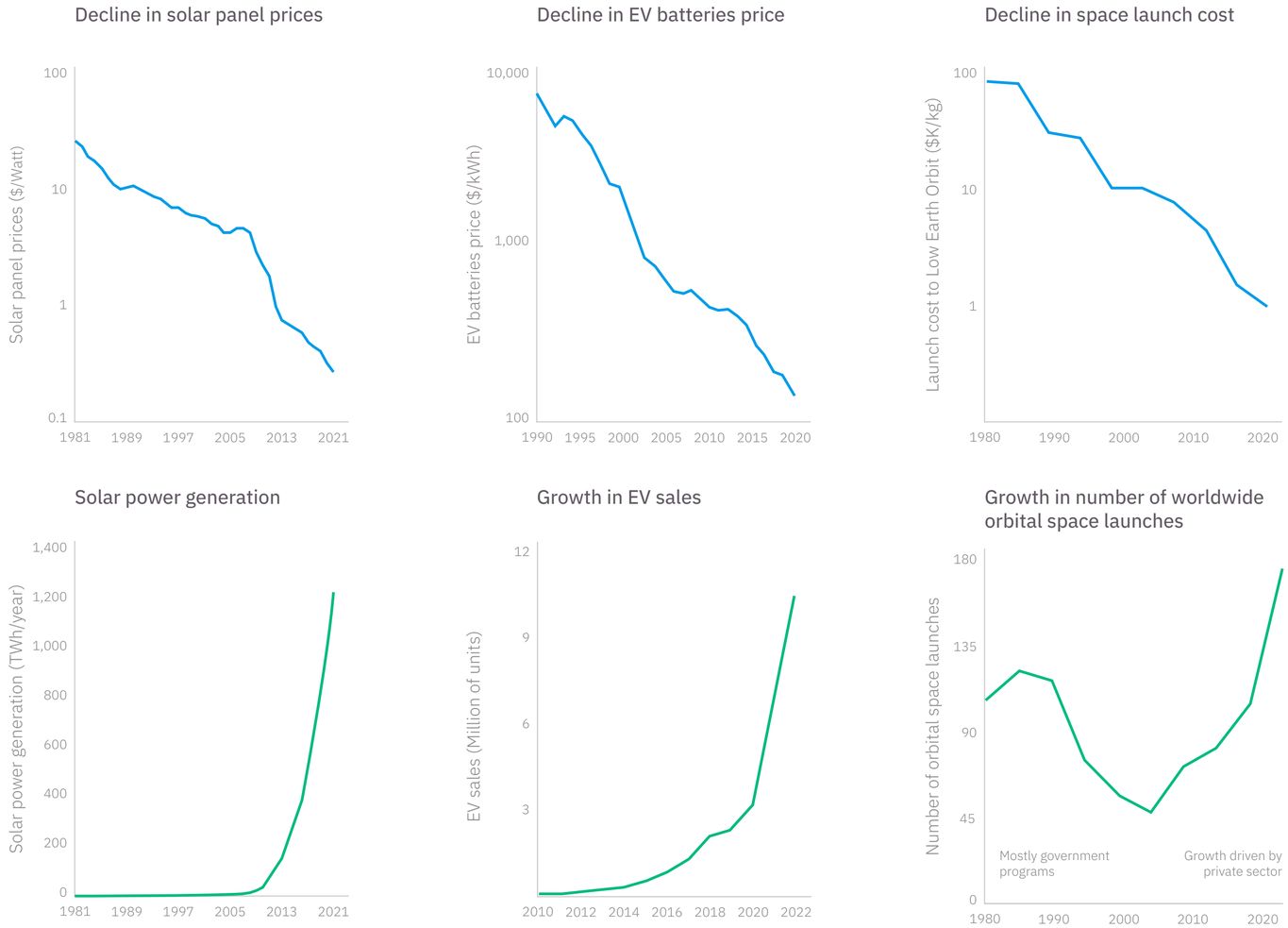
# Deep Tech drives rapidly falling costs and accelerated adoption

Deep Tech innovation is systematically driving down the costs of the technologies discussed in this report. This reduction follows a predictable pattern known as Wright's Law, which states that costs will decrease by a consistent percentage (around 20% for solar panels, for instance) with each cumulative doubling of units produced. As costs and prices decline, adoption and cumulative production increase, triggering further cost reductions and driving broader market penetration, as we can see in the graphs on this page.

Although the technologies discussed in this study still have relatively low penetration rates, this indicates ample room for substantial cost reduction and exponential growth in the years to come.

Consider solar panels as an example. The cost per watt of solar panels has plummeted from $115 in 1975 to $0.26 in 2021, accompanied by a remarkable rise in solar generation from 0.003TWh in 1983 to 1,040TWh in 2021. Solar energy is presently the most affordable form of energy available, yet its penetration remains at a modest 4%. This implies that solar energy will continue to double its market share multiple times in the upcoming years, leading to a remarkable price reduction of approximately 75% over the next decade.

## Evolution of cost and adoption of select exponential technologies



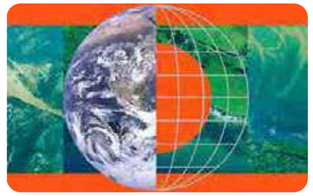

*Sources: Our World in Data, Bloomberg, Aerospace Security, Future Blind, CleanTEchnica, PV Magazine, Surfng Tsunamis analysis*

# Companies doing Deep Tech innovation around the world

REJUVENATE BIO

Epigenetic reprogramming to reverse pre-existing heart and metabolic disease, and kidney failure in humans

QUAISE



Deep geothermal energy solution to provide cheap clean energy anywhere on the planet

LILIUM

Electric air taxis that are expected to transport passengers in multiple locations by 2025

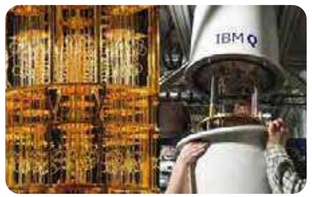
SPACEX

Fleets of large rapidly reusable rockets that will radically reduce cost and open the doors of space

TESLA

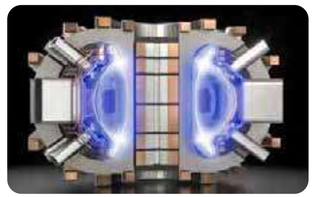
Scale deployment of self-driving electric cars and energy storage solutions

IBM




Quantum supercomputers that will be 100x more powerful than those deployed only two years ago

Commonwealth Fusion Systems



Fusion reactors that are expected to become commercial in the 2030s

OpenAI

Cutting edge AI models like Chat GPT to generate human-like content for diverse applications

FIGURE

General purpose humanoid robots to supply labor shortages in factories, homes, and space

Form energy

Cost-effective, multi-day energy storage systems to enable fully renewable grids

*Sources: Company websites, Surfing Tsunamis analysis*

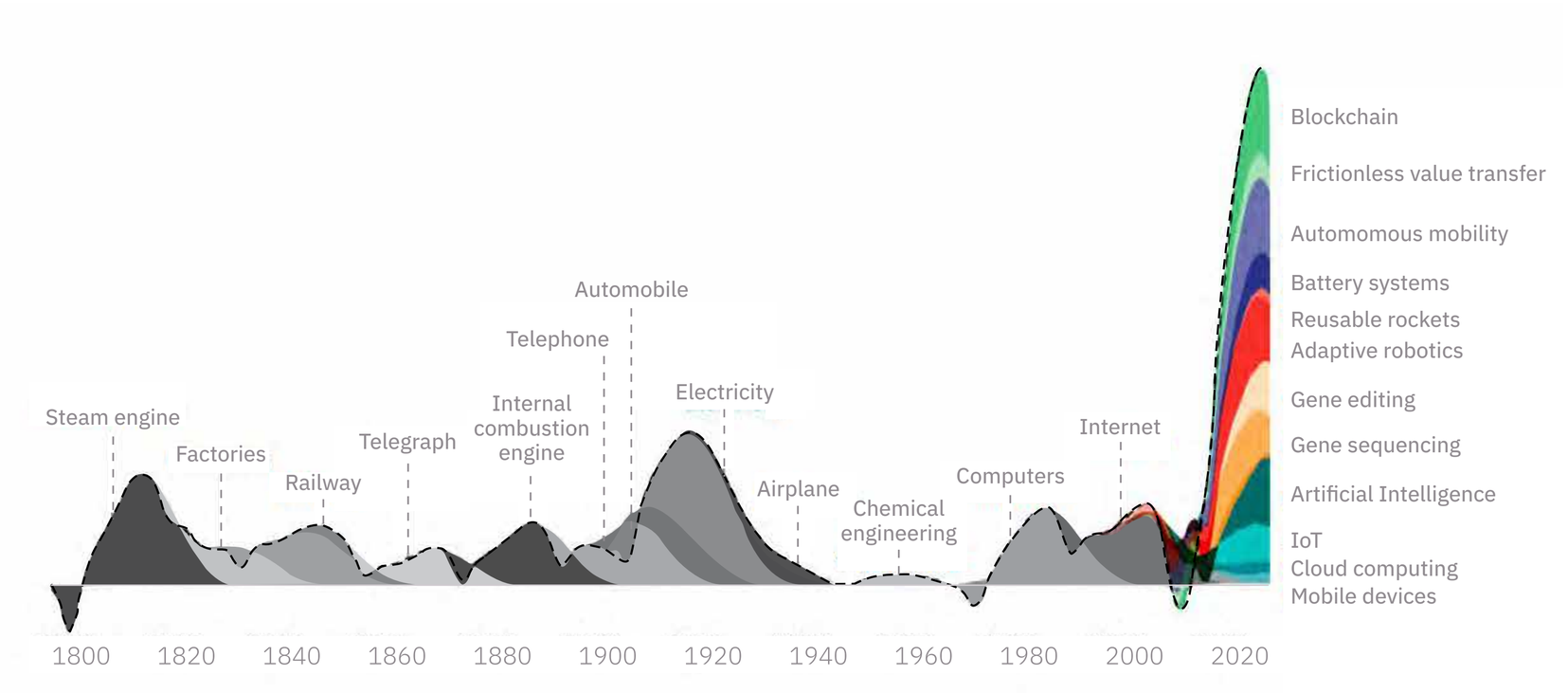
# Deep Tech will enable an unprecedented leap forward

Throughout the past two centuries, living conditions have significantly improved due to the emergence of several general-purpose technologies. Innovations like the steam engine, factories, telephones, electricity, and chemical engineering played instrumental roles in this progress. In more recent times, the advent of computers, the Internet, and smartphones has brought about profound changes in the lives of billions worldwide.

We are now witnessing the emergence of a new powerful wave of converging disruptive technologies. As we can see in this graph developed by Ark Invest, the convergence of these exponential technologies is expected to unleash an unprecedented economic impact.

To better grasp the size of the opportunity, consider that the steam engine enhanced our physical capabilities and contributed to a 0.3% annual GDP growth for half a century. Meanwhile, AI, with its potential to dramatically augment our cognitive abilities, is projected to boost global GDP by 1% per year in the decades to come.

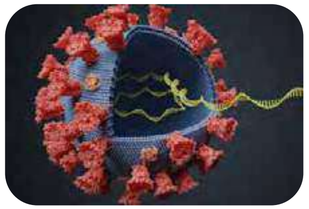
## Estimated impact of historical innovation platforms on economic productivity



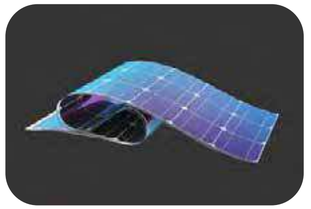

*Sources: Ark Invest, McKinsey, Surfing Tsunamis analysis*

# Deep Tech enables inclusion by democratizing access to basic needs and services

Mega constellations of Low Earth Orbit satellites such as SpaceX's Starlink provide high-speed connectivity to every point on the planet, enabling online jobs, telemedicine and bridging the digital divide in remote locations



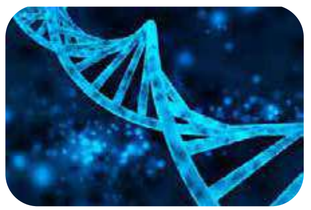
Advanced drug development technologies (AI, patients on chip, mRNA vaccines, cell therapy) are enabling ultra-low-cost vaccines and treatment for cancer, dementia, and all flu strains, making them broadly accessible



Flexible perovskite solar panels announced by Stanford and MIT can bring down the cost of electricity by 10x in coming years, enabling everyone to access distributed electricity generation


Generative AI models such as ChatGPT will increasingly enable anyone to have at their disposal the possibility of accessing services comparable with those of lawyers, doctors, designers, coders, designers, writers, etc. for free

Advanced laser and ultrasound technologies could enable highly effective and affordable cures for cancer, depression, and Alzheimer as well as 100x cheaper diagnoses of major diseases



New seeds, molecular farming of animal proteins, precision fermentation, and cultured meat can reduce the cost of major food commodities

AI education platforms (such as Letrus and Egg, from LAC) enable scalable and affordable basic literacy education as well as the acquisition of coding and English skills for tens of millions at a small fraction of the current cost

Satellite imagery, drones, and AI algorithms can help predict and enable better responses to natural disasters, reducing their impact on livelihoods and enabling effective recovery

New materials, 3D printing, and AI-generated designs can significantly reduce construction costs, enabling us to address its deficit in housing and infrastructure with houses such as those printed by Icon in Mexico

*Sources: World Bank, IADB, Surfing Tsunamis analysis*

# Deep Tech enables environmental protection and regeneration

Low-cost electric vehicles could capture +80% of global sales of new vehicles by 2030, cutting oil consumption by +30% and drastically reducing transportation-related emissions

Condensed batteries with 500 or more watt-hours per kilogram (Wh/kg), such as those announced by CATL in 2023, enable the electrification of commercial aviation, which accounts for ~8% of oil

Earth observation satellite constellations enable precision monitoring of emissions across the world as well as real-time tracking of ecosystems, deforestation, natural fires, pollutant leakages, etc.

Low-cost solar panels and batteries, compact nuclear fusion reactors (such as those under development in more than three dozen startups), and deep geothermal energy could enable abundant emissions-free clean energy

Naturally sourced, renewable, and sustainable materials (bioplastics, biodegradables) can replace petrochemicals used in manufacturing, which represent a further +15% of global oil consumption


Cultured meat, precision fermentation and alternative proteins can free up agricultural land, enabling re-forestation, emission reductions, as well as fish stock regeneration

Compact low-cost heat pumps such as those developed by Tesla using 3D printing and PCB (Printed Circuit Board) design techniques can eliminate the need for residential heating using fossil fuels

Ocean plastic capture systems such as those being developed by Ocean Cleanup using satellite imaging, remote sensing, computer modeling, and robotic systems could eliminate 90% of the 269K tons of floating plastic by 2040

Enhanced seeds, special microbe-based seed coatings, and AI-assisted regenerative agricultural practices could transform agricultural land into a giant carbon capture and sequestration engine to decarbonize the atmosphere

*Sources: Ark Invest, We Forum, Goldman Sachs, Surfing Tsunamis analysis*

# Deep Tech innovation is easier and more attractive than ever

Deep Tech innovation has become more accessible and appealing than ever. Multiple factors are converging to fuel the rise of Deep Tech innovation. The cost of innovation is decreasing, and accessible tools like CRISPR-based editing techniques are democratizing research capabilities.

Previously limited to governments and large corporations, these tools are now available to a broader audience. For instance, a Stanford group recently achieved training a program similar to ChatGPT at a cost of only $600.

Agile techniques are expediting innovation cycles, reducing time to market, and mitigating the challenges startups typically face during their early stages.

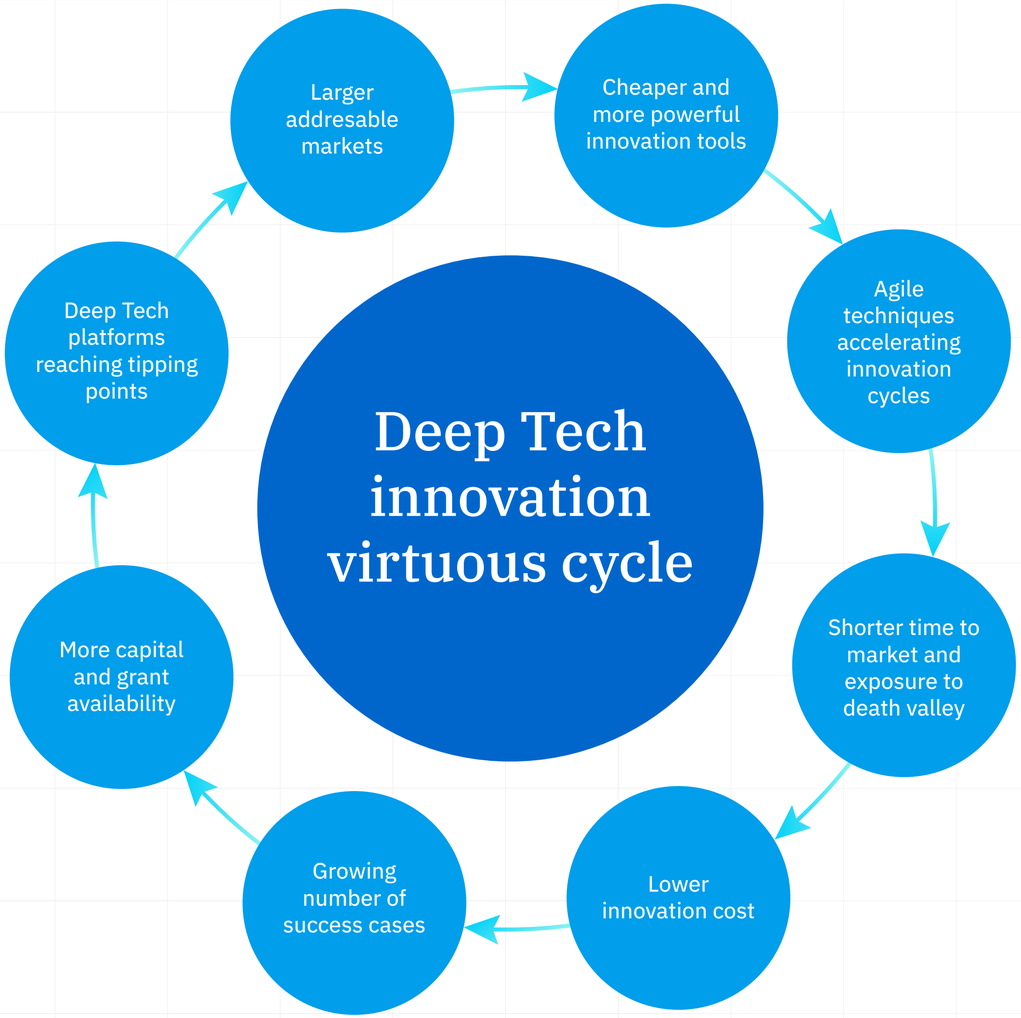
The success stories of companies such as Tesla, Moderna, and OpenAI are reshaping investor perceptions of Deep Tech. They demonstrate that exceptional value can be created beyond the realm of software. Consequently, there is a surge in available capital and grants, with numerous Deep Tech venture capital funds emerging.

Prominent figures like Bill Gates, among the world's wealthiest individuals, are actively investing in Deep Tech startups. Moreover, new instruments like SPACs have facilitated young Deep Tech companies' access to NASDAQ.

Established corporations such as Pfizer, Ford, Tyson, and GM are also acquiring Deep Tech startups and investing through corporate venture funds.

Governments are allocating significant resources to Deep Tech-related initiatives, as evidenced by the US's $738B investment in the Inflation Reduction Act and $2B in their National Biotechnology and Biomanufacturing Initiative.

Finally, the availability of Deep Tech platforms, including reusable rockets, AI transformer models, whole genome sequencing, and humanoid robots, is opening up vast new opportunities for further innovation.




*Sources: BCG, Stanford Daily, McKinsey, Surfing Tsunamis analysis*

# Deep Tech is becoming more appealing for investors

Investors often perceive Deep Tech startups to be more costly and time-consuming than digital startups. While it is true that Deep Tech ventures usually require more time, they are closer in terms of cost and development timelines to digital startups than commonly believed.

According to a recent analysis published in TechCrunch, Deep Tech Unicorns took an average of $115M in capital and 5.2 years to achieve a valuation of $1B.

A study conducted by the Boston Consulting Group reveals that Deep Tech startups typically require an average investment of $200,000 to $1M and around 2 years to develop a prototype. Subsequently, it may take an additional one to two years to enter the market successfully.

Furthermore, the returns on investment can be attractive, creating conditions for accelerated growth. This is evidenced by the attractive returns of some leading Deep Tech funds and in the growth seen in Europe, where venture capital investments in Deep Tech grew 18-fold in the past 10 years.

The situation is even more favorable in the Latin America and Caribbean (LAC) region, as we explain in the upcoming sections of the report. Early-stage innovation is human capital intensive and the cost of talent is lower for startups based here, offering an advantageous scenario for Deep Tech entrepreneurs in LAC.

**Investment in Deep Tech startups grows while capital and time requirements for their development drops**

**$115M**

mean capital to reach $1B valuation

**5 years**

mean time to become a Deep Tech Unicorn

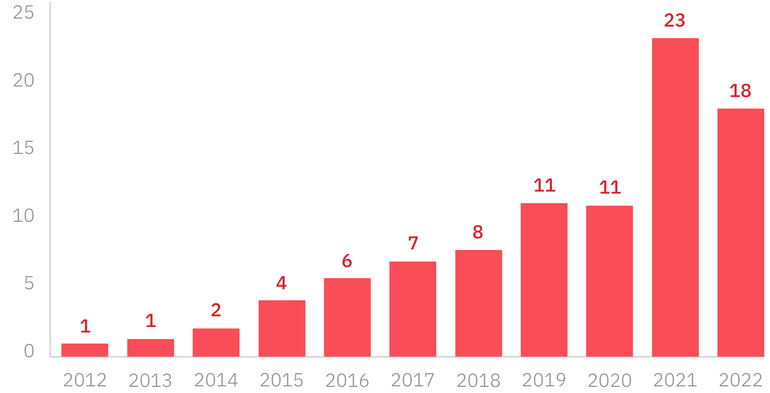
**$200K-1M**

to make a prototype

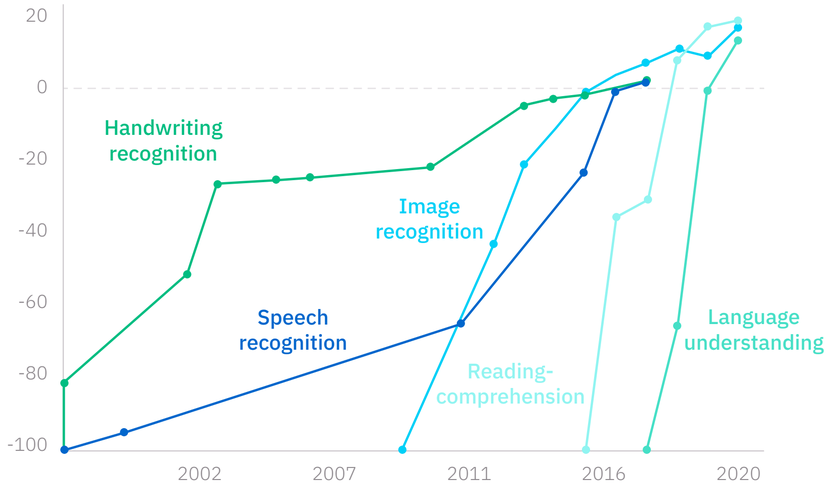
**22-30%**

net annual return of a leading global early stage Deep Tech fund

VC investment in European Deep Tech startups




Capabalities of AI systems have improved rapidly



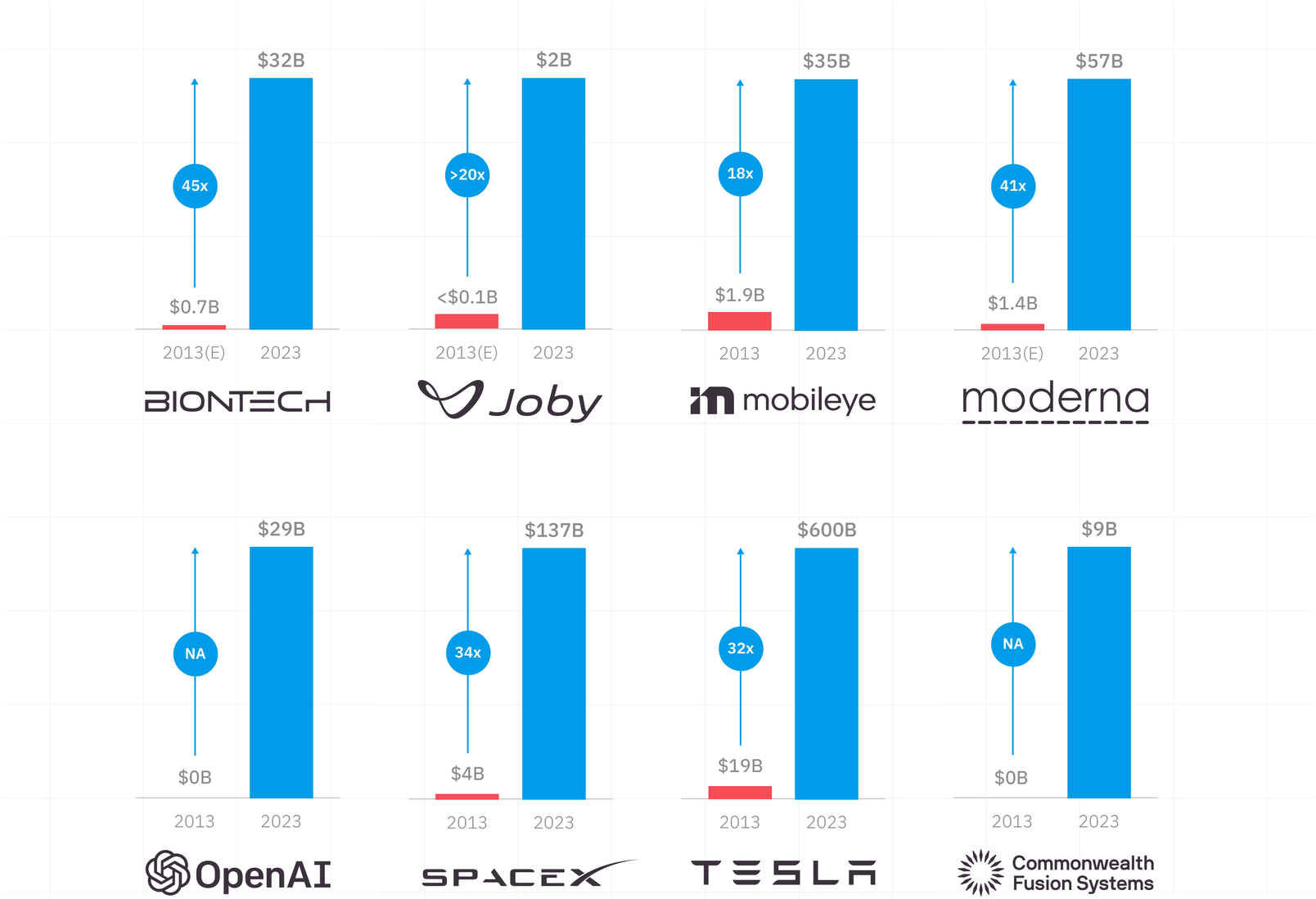

*Sources: Market interviews, BCG, Euromonitor, TechCrunch, DealRoom, Surfing Tsunamis analysis*

# Massive value creation in Deep Tech despite the bear market

In the past 12 months, we witnessed a significant decline in the value of publicly-listed technology companies. The stocks of many Deep Tech companies experienced a substantial drop (70-90%) since their peak. Such circumstances might lead one to question the attractiveness of Deep Tech in a high interest rate scenarios considering their longer timeframes.

However, as illustrated in the graphs on this page, Deep Tech startups like Tesla, Moderna, Joby, and OpenAI have generated substantial value for their shareholders over the past decade, despite the recent decline in valuations.

OpenAI and Commonwealth Fusion Systems are particulary remarkable, because they are worth $29B and $9B respectedly, and were founded after 2013. The other companies multiplied their valued by 18x to 45x during the last decade.




*Sources: Crunchbase, INTC, NY Times, Companies Market Cap, Bloomberg Stocks, Dealroom, TechCrunch, CNBC, Surfing Tsunamis analysis*

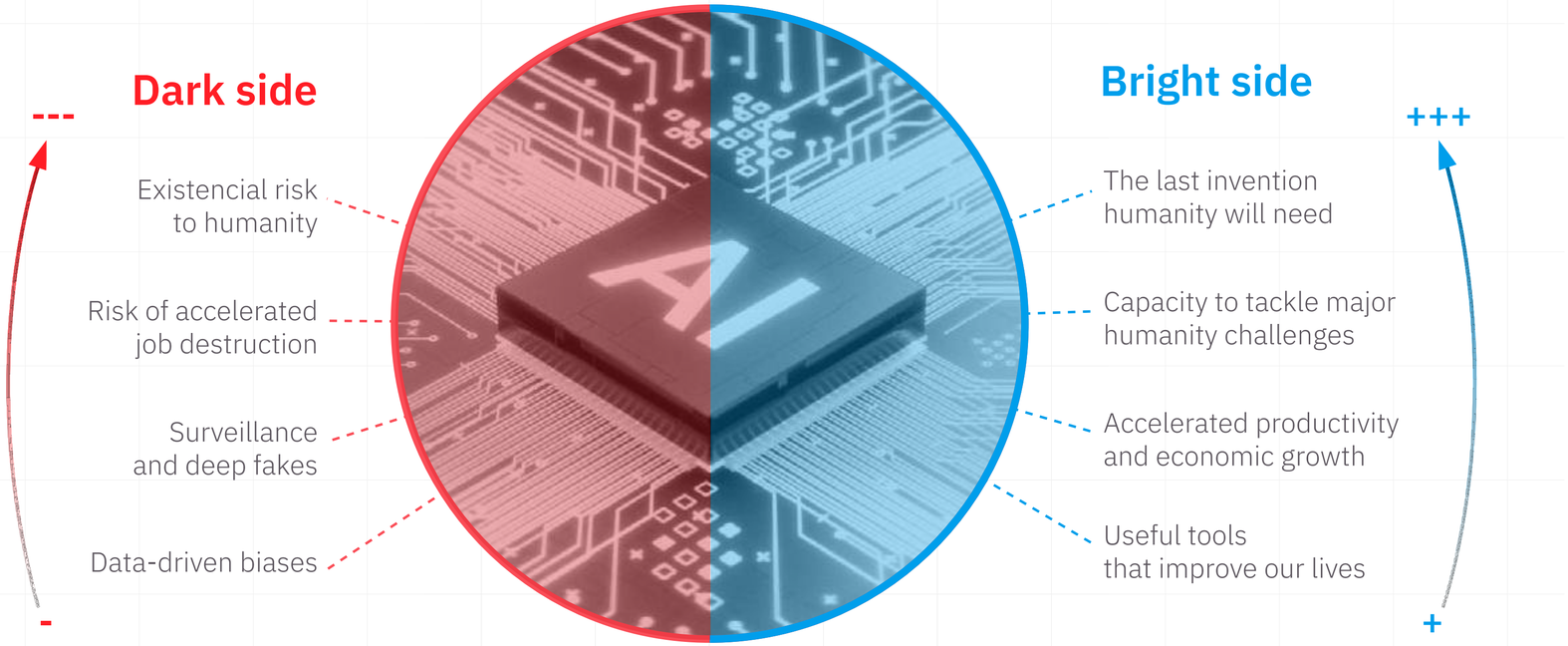
# Deep Tech is powerful and requires ethical approaches

Technology empowers us to shape lives, either for better or worse. Throughout history, each new technological advancement presented us with new ethical dilemmas. Fire, for instance, can provide warmth and comfort, but it can also be destructive. Arrows, while serving as a means to procure food, can also be instruments of war.

Deep Tech innovations grant humanity unprecedented power, demanding our utmost mindfulness in their application.

Take AI as an example. It brings forth a myriad of challenges encompassing biases, privacy concerns, job displacement, and existential risks. However, it also holds the potential to enhance our lives, bolster our economies, and address humanity's most pressing issues.

However, it is essential for the region to maintain a realistic perspective. Our influence on the overall trajectory of these technologies is mostly limited, so our focus should lie in utilizing them to benefit our communities and in creating solutions that make the world a better place. We must leverage these advancements to foster modern, prosperous, inclusive, and sustainable economies.




*Source: Surfing Tsunamis analysis*

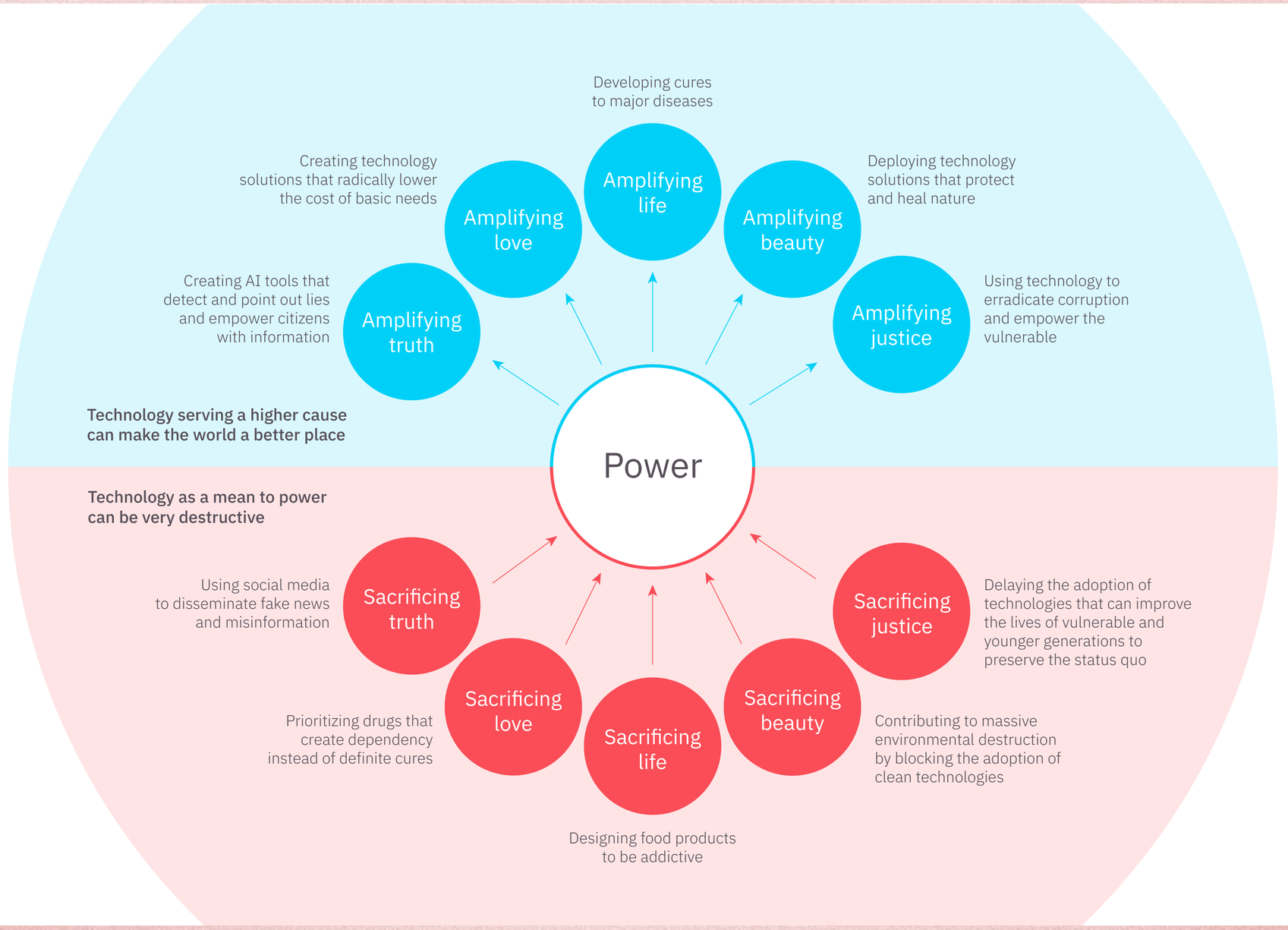
# Deep Tech calls for new ethical frameworks

New technologies expand our possibilities and empower us, but their ultimate impact on humanity hinges upon the value systems that guide their implementation.

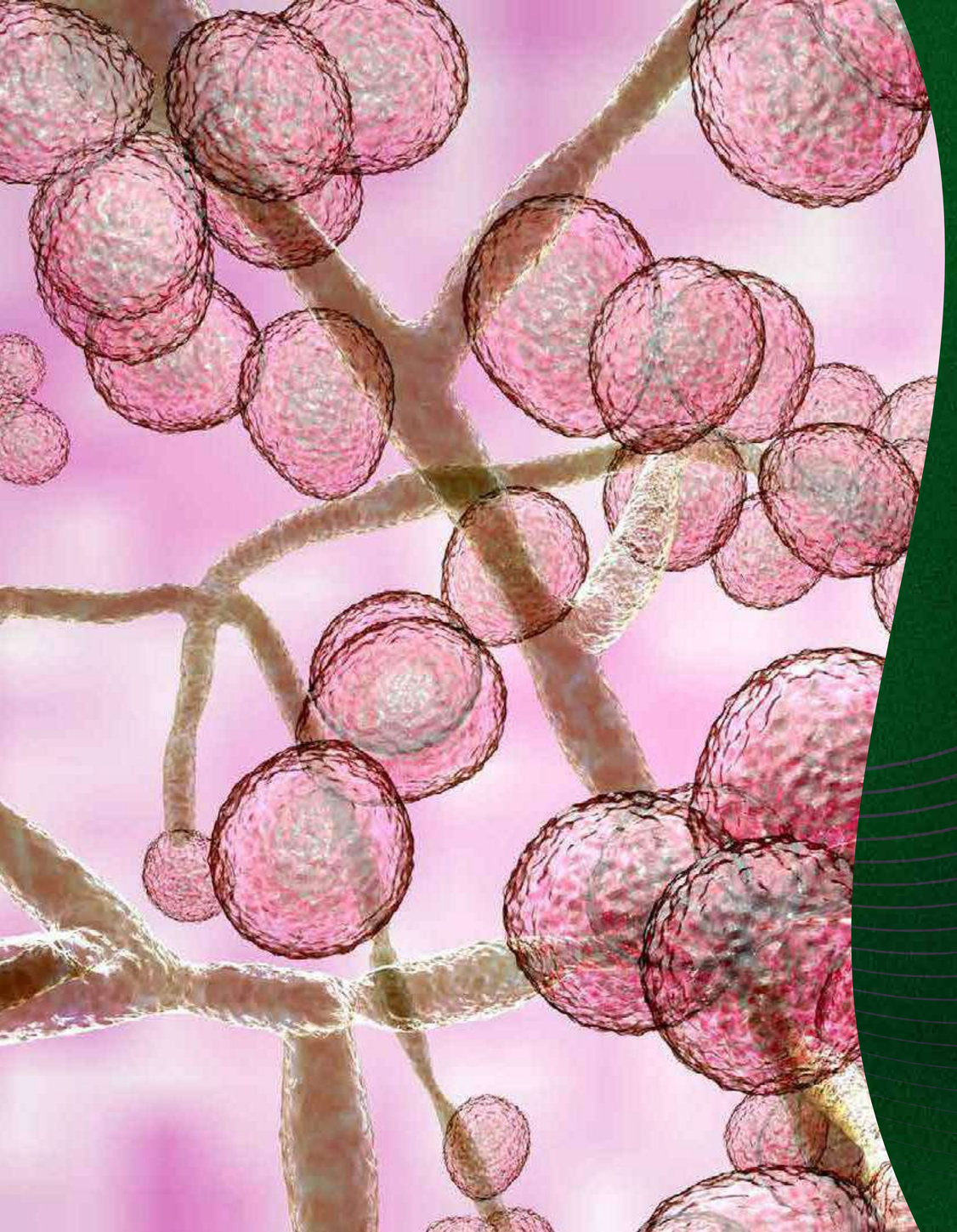
Many of the challenges we confront today stem from the sacrifice of fundamental values such as truth, love, beauty, and justice in pursuit of power. Over the past four decades, leaders perpetuated unsustainable living standards that jeopardize future generations.

To forge a better future and enhance lives, we must dare to disrupt the unsustainable and harness technological innovation in service of higher values such as truth, love, beauty, and justice.

Fortunately, a new generation of dedicated investors and entrepreneurs is committed to realizing this vision. The immense power of these technologies instills hope that we can overcome our daunting legacy and build a more prosperous future for humanity as a whole. However, the outcome relies on our collective wisdom and unwavering dedication to the common good.




*Source: Surfing Tsunamis analysis*



Chapter 2

# DEEP TECH CAN TRANSFORM LAC

# Now is the moment for developing countries

to take advantage of the high increases in productivity associated with this new technological revolution and catch up economically, while helping to protect the planet.

*UN Technology and Innovation Report 2023*

# Technology empowers the less empowered.

If there is a strong force that can bring a change in the lives of those on the margins it is technology. It serves as a leveler and a springboard.

*Narendra Modi, Prime Minister of India*

*Source: Surfing Tsunamis analysis*

# Deep Tech radically expands the development frontiers

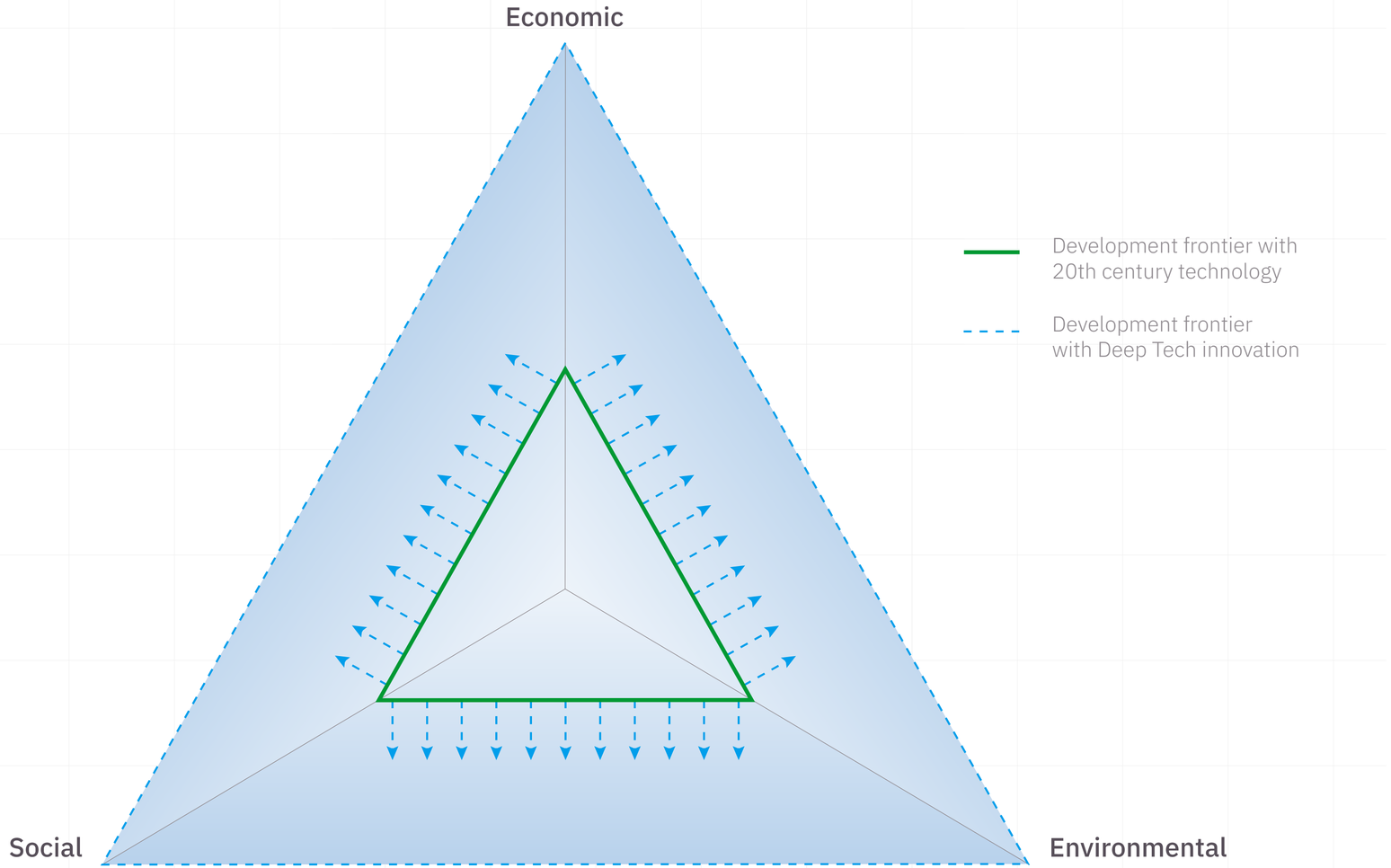
The previous chapter underlined many global challenges that the Latin America and Caribbean (LAC) region also grapples with. Relative to regions like Asia, LAC lags in growth, inflation control, poverty reduction, and education.

Global factors such as climate change, high debt levels, and aging populations elsewhere will impede LAC's progress within the current technology paradigm. Policymakers face mounting difficulty in achieving a balance between economic growth, social development, and environmental protection.

However, Deep Tech innovation presents an opportunity for LAC countries to bypass traditional development obstacles and unlock unprecedented possibilities. Cutting-edge technologies like AI, solar power, electric vehicles, biotech, advanced manufacturing, and space-based broadband have the potential to pave new paths for economic growth, social equity, and environmental sustainability in the region.

Solar energy is a prime example. Its broad adoption can decrease electricity costs, stimulate economic growth, and create jobs. Socially, it can help bridge the socio-economic divide by supplying electricity to remote and underserved communities, thereby improving their quality of life and enhancing connectivity. Environmentally, transitioning to solar power can substantially lower the region's carbon emissions, a vital step for the climate-vulnerable LAC region. By seizing these and other opportunities presented by Deep Tech, LAC can surmount existing challenges and progress towards a more sustainable and inclusive future.

**Displacement of development frontiers enabled by Deep Tech across major dimensions**




*Source: Surfing Tsunamis analysis*

# LAC needs innovation to drive productivity and growth

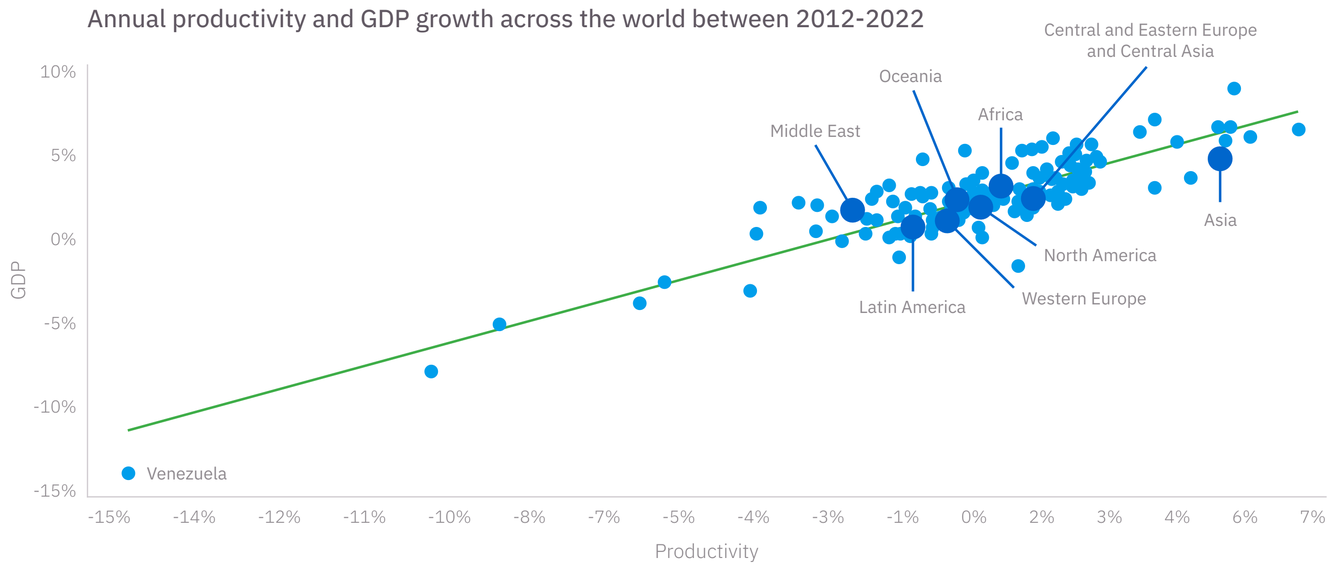
The graph on this page clearly demonstrates that economic development is intrinsically linked to productivity growth.

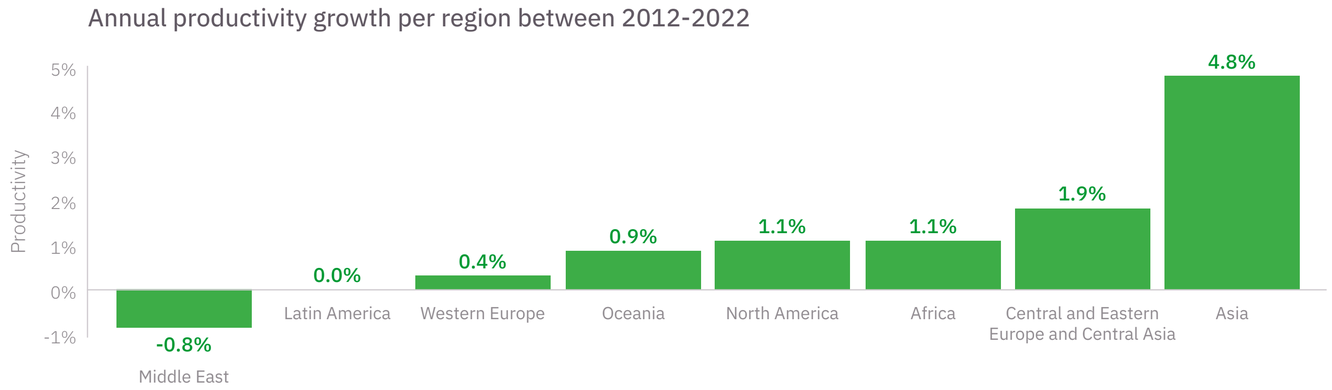
For decades, LAC has lagged behind in terms of productivity and economic expansion. Overreliance on natural resources, subpar educational performance, weak institutions, and limited emphasis on innovation exerted negative impacts on our overall prosperity, poverty rates, and environmental sustainability.

Throughout the past decade, LAC underperformed in comparison to other global regions, failing to achieve any notable productivity growth.

To reignite their growth trajectory, it is crucial for LAC countries to achieve a sustained leap in productivity. This can only be accomplished by harnessing the power of Deep Tech innovation to transform major economic sectors.

## Productivity and GDP growth in LAC and across the world




*Sources: The Conference Board, Surfing Tsunamis analysis*

# Sustainable economic growth demands innovation

*Source: Surfing Tsunamis analysis*

# LAC can leverage the Deep Tech revolution in three ways

Latin America and the Caribbean (LAC) can leverage Deep Tech innovation in three ways.

The first path is early adoption. Countries in LAC can benefit by buying and adopting advanced technologies developed outside the region. For instance, Uruguay, Costa Rica, and Chile are rapidly developing renewable energy sectors, which leads to benefits such as lower costs, job creation, and reduced environmental footprints.

The second path is to use Deep Tech to create new product offerings that don't involve a high technology development risk. LAC entrepreneurs have leveraged mobile and cloud computing to create e-commerce and fintech Tecnolatinas, generating over $200B in the past decade. Now, they have the opportunity to create new solutions powered by AI foundational models that are largely developed in other countries.

The third path is to create new technologies. For the first time in history, LAC can generate Deep Tech startups at scale. The emergence of such startups can have an outsized positive impact. They not only capture global demand, attract investments, create well-paid jobs and boost advanced R&D activities, but they can also enable the creation of entirely new, powerful industries.

## Paths for LAC to benefit from the Deep Tech revolution

| | Adopting Deep Tech | Building upon Deep Tech | Creating Deep Tech |
|---|---|---|---|
| Description | Buying and manufacturing advanced technologies developed outside the region | Use Deep Tech to create new product offerings that don't involve a high technology development risk | Create new technologies and products that require significant innovation |
| Examples | Uruguay, Costa Rica and Chile rapidly deploying renewable energy and Mexico attracting Tesla Gigafactory | LAC startups leveraging smartphones or AI to create new offerings | Satellogic creating a new satellite design that enables Earth Observation at a radically lower cost |
| Challenge | Overcoming resistance to change to be an early adopter | Finding a defensible product-market fit | Developing intellectual property that enables new businesses |
| | Critical to ensure competitiveness and enable modern regional ecosystems | Most of the value creation will come from these levers, which enable new industries, advanced HQ functions and R&D and an innovative knowledge-based economy | |

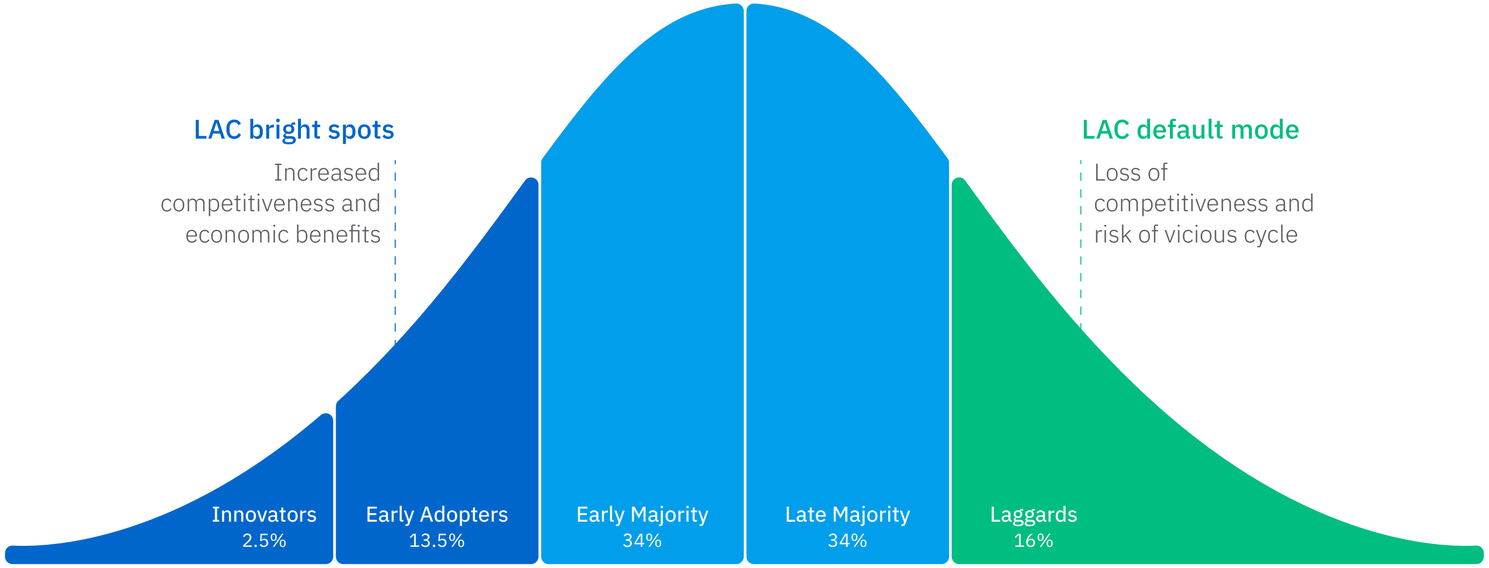
*Sources: Surfing Tsunamis analysis*

# LAC should leverage Deep Tech to leapfrog into the future

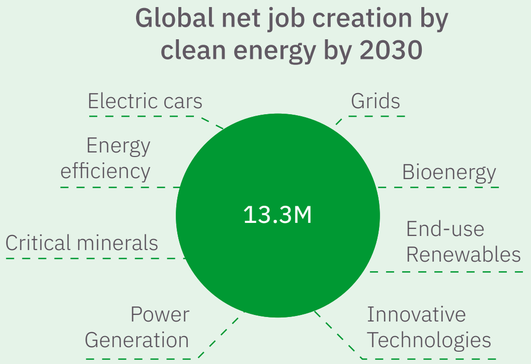
The countries that benefit the most from technology revolutions are those that embrace new innovations early on. Unfortunately, Latin America and the Caribbean (LAC) countries often choose to resist change and delay the adoption of new technologies.

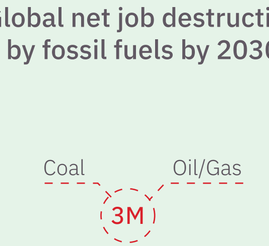
Regardless of historical factors, it is crucial for the region to become early adopter of technology now. As stated in the UN's 2023 Technology and Innovation Report, *"This is the opportune moment for developing countries to capitalize on the substantial increases in productivity associated with this new technological revolution, enabling them to catch up economically while safeguarding the environment. Failing to seize this green technological wave due to inadequate policy attention or a lack of investment in developing skills and capabilities would have enduring negative consequences."*

If LAC chooses to delay, the region will face the downsides of technological change while missing out on massive opportunities. For instance, the International Energy Agency (IEA) estimates that clean energy will generate 13.3 million jobs in this decade, while 2.7 million jobs will be lost in the fossil fuel sectors worldwide; if LAC delays change, the region will be vulnerable to these job losses and miss out on the job creation opportunities.




## In energy, LAC can create jobs by accelerating clean energy adoption




*Sources: Everett Rogers, IEA, UNCTAD, World Economic Forum, Surfing Tsunamis analysis*

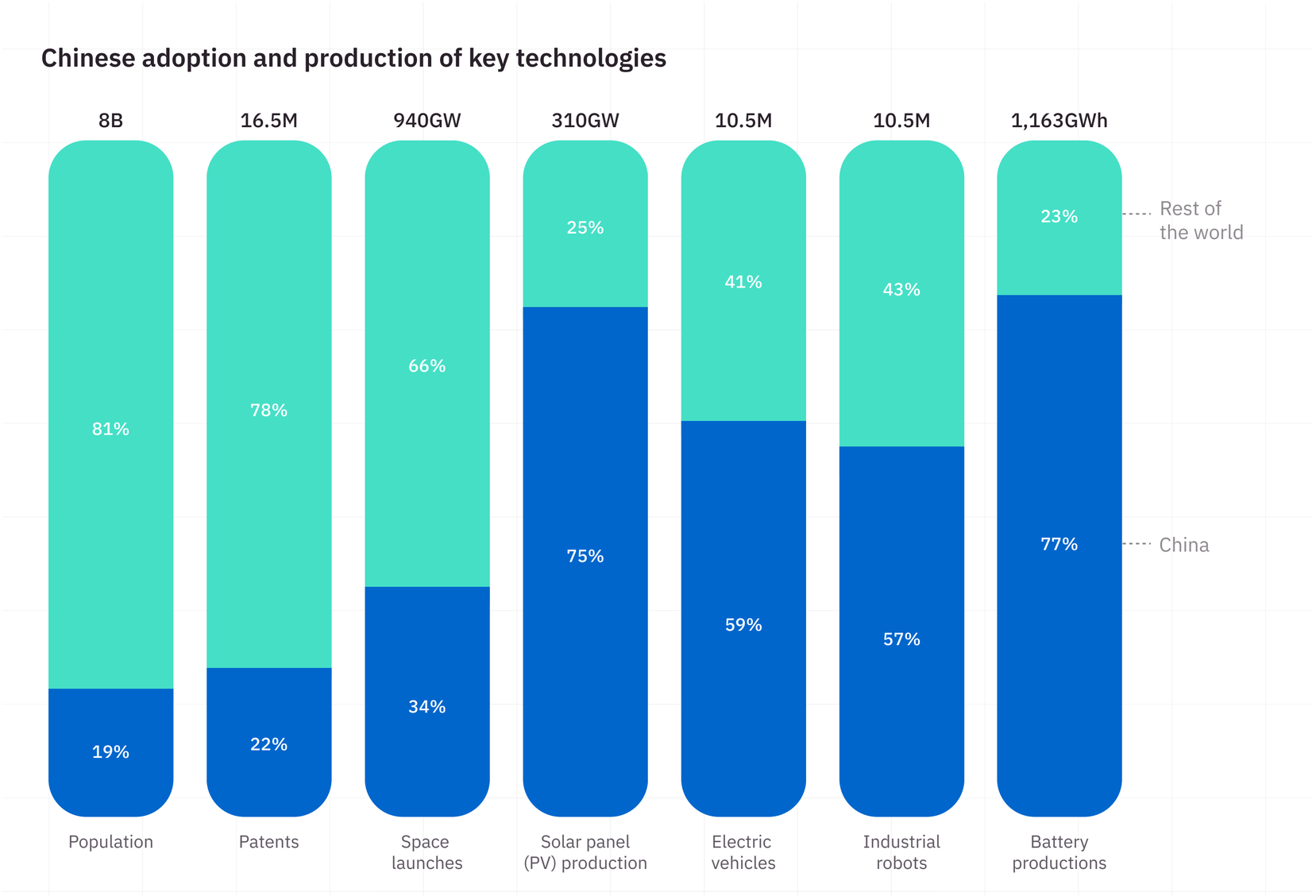
# China shows countries can choose to lead the industries of the future

China recognizes the need to transition into an innovation-driven economy to sustain its growth. To achieve this vision, the country has systematically implemented long-term strategies such as Made in China 2025 (released in 2015) and the AI strategy (released in 2017). These strategies lead to substantial resource allocations.

As a result, China currently holds a significant share of the industries of the future. Despite having only 19% of the global population and 22% of the patents, the country commands between 34% and 77% of the global market share in industries dominated by Deep Tech innovation, including space launches, solar panels (PVs), electric vehicles (EVs), industrial robots, and batteries.

Similar strategies are also employed by innovation-driven economies such as the US, the EU, Korea, Singapore, and Israel. Therefore, these policies can be replicated with adaptations and increased reliance on private sector players.

This approach is common in developed markets. The key lies in committing to building the economy of the future. LAC countries should prioritize Deep Tech innovation as it will drive the industries of tomorrow.




*Sources: WIPO, Statista, PVTech, IRENA, CleanTechnica, VisualCapitalist, Reuters, Surfing Tsunamis analysis*

# LAC proved it can be an early adopter of new technologies

LAC countries have demonstrated their ability to be early adopters of new technologies and advanced technology operations through determined efforts.

From 2014 to 2018, Uruguay significantly boosted the adoption of wind turbines, with wind energy reaching 40% of electricity generation, making the country a global leader in wind energy adoption.

Similarly, Chile started from scratch in 2012 and became a world leader in solar adoption by 2022, achieving 17% of electricity production from solar.

Furthermore, Bogota, which acquired its first electric bus in December 2019, now boasts the largest fleet of approximately 1,500 electric buses outside of China.

Costa Rica attracted Intel operation in 1997, which drove 36% of the country's exports by the year 2000. In 2014 the company closed its plant and diverted its operation to Asia. But now the company is back with a new manufacturing and testing facility that involved $1B in investments and 1,750 new jobs.

Other LAC countries have similar success stories. To leapfrog into the future, future-oriented policymaking approaches are needed.

## Examples of leadership in the early adoption of new technologies in LAC

Costa Rica attracted a new Intel chip manufacturing and testing plant that involves $1B in investments and 1750 new jobs

Uruguay became a leading wind energy adopter in the world reaching 40% penetration

Chile became a leading solar energy adopter in the world reaching 17% penetration

Bogota is the city with the largest bus fleet outside of China with 1,500 E-Buses

*Sources: Chilean Government statistics, BYD Colombia, BID, Tesla, PR NewsWire, Re Charge News, Surfing Tsunamis analysis*

# Mexico shows the way in attracting Tesla's largest Gigafactory

The Tesla Gigafactory that will be built in Nueva Leon, Mexico, serves as a shining example of how LAC countries can propel themselves into the future. This project, described by Elon Musk, Tesla's CEO, as the world's largest electric vehicle plant, will cover a land lot of 1,200 hectares, with 40 hectares dedicated to the plant itself. The initial investment of $5B could potentially scale up to $10B.

The factory is expected to produce over one million vehicles, generating over $15B in annual exports and up to 6,000 direct jobs and 30,000 indirect jobs in the automotive sector, as well as additional employment opportunities in related industries.

The Gigafactory will manufacture next-generation vehicles, aiming to reduce the cost of electric vehicles, catering to both North American and LAC markets.

Notably, it is anticipated to be one of the pioneering facilities globally in implementing humanoid robots at scale, which shows that robots can benefit job creation in LAC countries.

*Image: Tesla*

**$5B-$10B**
planned investment by Tesla

**1M-2M**
advanced electric cars produced per year

**35K**
direct and indirect new jobs

**15K+**
indirect jobs created

*Sources: Mexican Government, Tesla, El Economista, Hipertextual, The Logistics World, Surfing Tsunamis analysis*

# LAC connectivity will be redefined by satellite mega-constellations

The impact of new satellite internet services on LAC (Latin America and the Caribbean) will be profound. In our vast and often hard-to-reach territory, approximately 80% of the population currently lacks fast and reliable fixed broadband. The advent of new satellite services will provide speeds ranging from 20 to 100 Mbps, empowering people in remote locations to work online and access global markets from anywhere. The current subscription cost for Starlink varies across LAC countries between $30-60 per month, and increased competition is expected to drive prices down in the future. Furthermore, local cooperatives can facilitate broadband sharing to reduce costs for users.

These services and benefits are made possible by Deep Tech innovations. Reusable rockets enable the launch of constellations of tens of thousands of small satellites to orbit in Low Earth Orbit (LEO). Laser links enable high-speed connectivity that is up to 100 times faster than that provided by traditional radio antennas.

One prominent example of such a mega-constellation is SpaceX's Starlink, which already has over 4,000 satellites orbiting the Earth (in 2018, humanity had a total of fewer than 2,000 active satellites). Notably, SpaceX envisions expanding the Starlink fleet to include 42,000 satellites in the future. Similar projects are also being pursued by the EU, OneWeb, Amazon, and others.

*Sources: SpaceX, Wikipedia, TS2, IDB, Mexico New Daily, Wired, Surfing Tsunamis analysis*

*Image: Starlink*

**100%**

of LAC territory will be covered

**80%**

of LAC population outside of major urban centers and without reliable fixed broadband connection

**100+**

Mbps connections enabling remote working

**$82B**

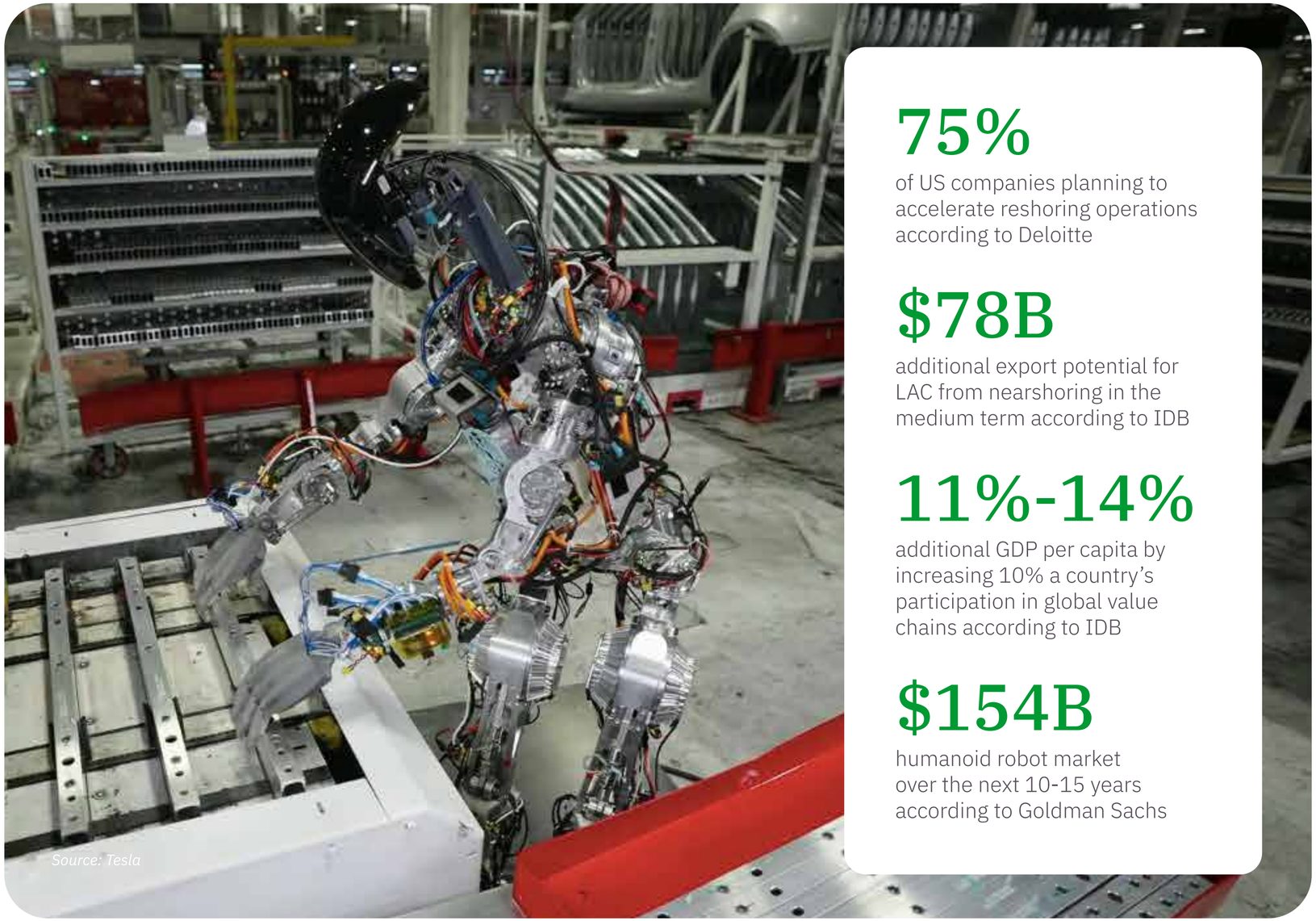
investment estimated by the IDB required for LAC to meet fixed broadband capacity UN SDGs

# Humanoid robots and advanced manufacturing tech will enable the re-industralization of LAC

Companies such as Tesla, Figure, and the OpenAI-backed 1X are expected to commence large-scale production of humanoid robots within the next 12-24 months. Instead of worrying about the automation of existing jobs, LAC should view this as an opportunity to revive manufacturing.

Over the past 30 years, LAC experienced a loss of manufacturing jobs and investments to Asia, driven by higher labor costs. However, labor costs in countries like China have significantly increased, eroding the cost differentials and raising supply chain concerns. This has given rise to a substantial movement of reshoring and near-shoring, facilitated by smart factories powered by advanced manufacturing technologies like collaborative robots, 3D printers, artificial intelligence, digital twins, and connected devices.

According to a global study conducted by Deloitte, *"75 percent of companies are planning to accelerate their reshoring initiatives by establishing smart factories in closer proximity to their home locations or customers' point of need."* This presents an opportunity involving hundreds of thousands of jobs and tens of billions of dollars in annual investments.



*Source: Tesla*

**75%**

of US companies planning to accelerate reshoring operations according to Deloitte

**$78B**

additional export potential for LAC from nearshoring in the medium term according to IDB

**11%-14%**

additional GDP per capita by increasing 10% a country's participation in global value chains according to IDB

**$154B**

humanoid robot market over the next 10-15 years according to Goldman Sachs

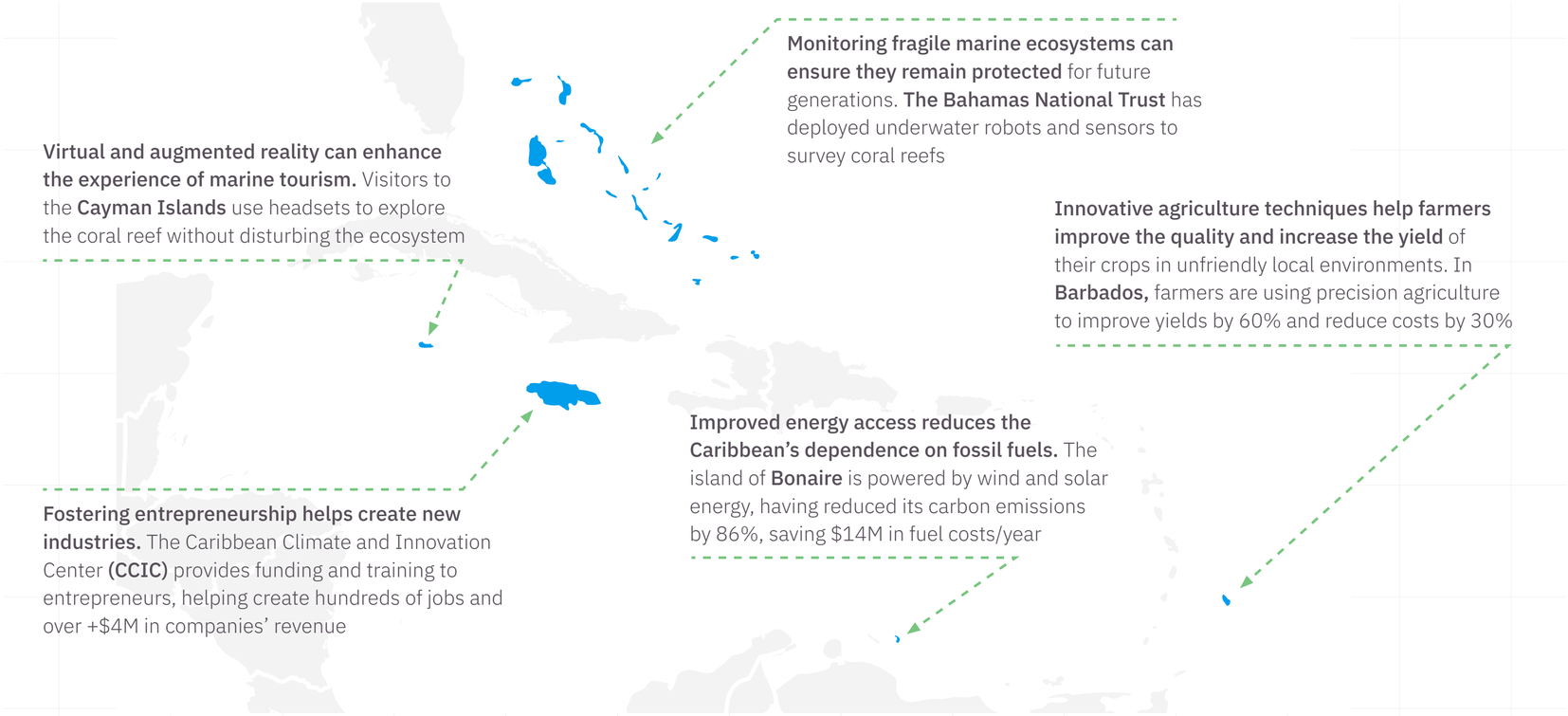
*Sources: Axios, Deloitte, IDB, Goldman Sachs, Surfing Tsunamis analysis*

# Deep Tech can improve lives in the Caribbean

The Caribbean region can greatly benefit from the active adoption of Deep Tech innovations developed elsewhere. These innovations can address the significant challenges of internet access with new satellite internet solutions, reduce reliance on oil through the use of solar panels and electric vehicles (EVs), increase resilience to severe climate events with batteries and satellite imagery, enhance monitoring and protection of delicate natural assets like coral reefs with sensors, and vastly improve island flight connections with Vertical Takeoff and Landing (VTOL) vehicles such as those developed by Lilium and Joby Aviation.

The size and diversity of these countries also provide a formidable advantage in terms of agility. This has been a critical success factor for countries such as Singapore, Estonia, Israel, and Ireland, which have rapidly adapted to global changes and opportunities.

The region is already making progress. Puerto Rico, for instance, has achieved significant residential solar adoption, surpassing all but seven US states. In Barbados, farmers are utilizing precision agriculture algorithms to enhance yields. Several countries are implementing telemedicine solutions, and most countries have already authorized SpaceX's Starlink service.




**Enhance healthcare** through precision medicine, genomics, and biotech can improve and personalize healthcare outcomes in geographies with historically low access to developed or specialized medical care

**Advancing education** can significantly transform the future of the Caribbean, especially considering its particularly large and growing young generation. AI-fueled e-learning platforms, virtual reality, and augmented reality can help improve access and provide students with more engaging and immersive learning experiences.

**Underwater drones and satellite imagery** help monitor fish populations and understand the health of the ocean to create sustainable fisheries that support the livelihoods of fishermen in the Caribbean.

*Sources: World Bank, CCIC, Energy Transition Initiative, Surfing Tsunamis analysis*

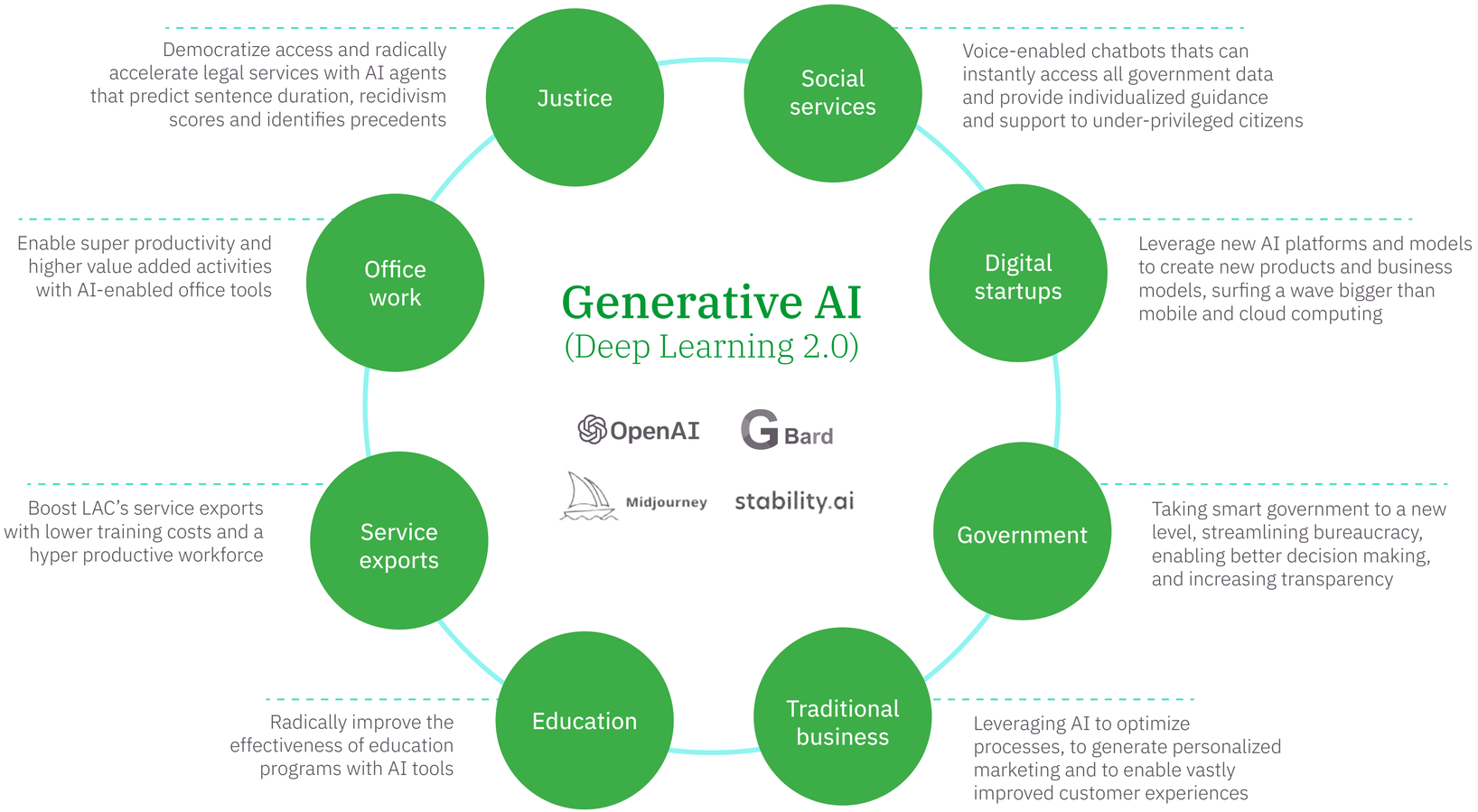
# AI can have a profound impact on LAC

We are currently witnessing an explosion of new Artificial Intelligence technologies, including Large Language Models, Transformers, Diffusion Models, Zero-Shot Learning, and Autonomous Agents. While chatbots like ChatGPT and text-to-image services such as Midjourney are widely used, they represent only the tip of the iceberg. Major technology companies, like Google and Microsoft, and numerous startups are striving to capitalize on the opportunities presented by these technologies.

The impact on productivity will be profound. The potential applications in LAC countries are vast, ranging from enabling personalized and affordable social services to enhancing public services and legal systems, as well as optimizing processes and fostering the growth of startups providing innovative services.

People residing in LAC countries stand to benefit tremendously. Similar to the mobile revolution, AI will democratize access to services and level the playing field for low-income individuals. This technology has the potential to bridge the gap between them and more educated, affluent individuals. Consider, for example, the transformative effect it will have for individuals who cannot access legal, medical or translation services who can now (or will soon) use free, high-quality AI agents to address their needs..

## Potential applications of Generative AI in LAC




*Source: Surfing Tsunamis analysis*

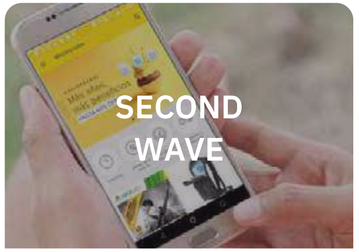
# Generative AI can unlock a new powerful wave of digital startups across LAC

Digital startups represent the vast majority of technology companies in the region. The Tecnolatinas revolution, born with the rise of the internet during the Dotcom boom of the late 1990s, gave birth to pioneering giants like MercadoLibre and Globant.

The advent of mobile and cloud computing laid the foundation for LAC's thriving startup ecosystem, witnessing the emergence of new companies such as Rappi, Nubank, and numerous other unicorns. Consequently, the value of the ecosystem surged from $7B in 2010 to over $300B by 2021, with venture capital investments skyrocketing from less than $100M in 2010 to over $15B in 2021.

We firmly believe that generative AI initiates a new and more potent wave of disruption, empowering LAC entrepreneurs to elevate value creation to unprecedented heights. The ecosystem is now better equipped than ever to ride this wave, which introduces radical possibilities for transforming the regional economy. While the majority of LAC startups may not delve into Deep Tech innovation in this area, they will leverage the innovation developed worldwide to craft new offerings and business models.

**Three waves of technology innovation in LAC**

| |  |  |  |
|---|---|---|---|
| Novelty | Dotcom | Mobile/Cloud | Generative AI |
| Period | 1995-2010 | 2010-2022 | 2023+ |
| Example | mercado libre | nubank | ? |

*Sources: LAVCA, Surfing Tsunamis analysis*

# LAC could generate 4 million jobs and $100B+ in service exports with Deep Tech innovations

In 2021, LAC exported $49B worth of knowledge-based services such as software development and professional services. While this may seem substantial, our market share remains below 2%, trailing behind countries like Ireland, Israel, Canada, and Korea, which have considerably smaller populations.

However, the potential for growth is immense. If LAC were to match Costa Rica's per capita exports, the region's export value would exceed $700B. International experience shows that tripling exports within a decade is entirely feasible. This would result in an additional $100B+ in export revenue and the creation of four million new jobs, assuming an average export value of $25K per person.

Deep Tech will play a pivotal role in accelerating this growth. As demonstrated by the widespread connectivity facilitated by mega-constellations, anyone can now stay connected. Furthermore, AI-enabled collaborative learning technologies have reduced training costs per graduate by a factor of 10 and can be scaled to accommodate millions. Argentina, for instance, already leveraged these solutions to train tens thousands of students in coding.

*Sources: WTO, market interviews, Surfing Tsunamis analysis*

**$100B+**

potential additional knowledge-based service exports from LAC in a decade

**4M**

new jobs could be created

**10x**

cost reduction in training coders leveraging AI technology

**200K**

coders being trained by Argentina government

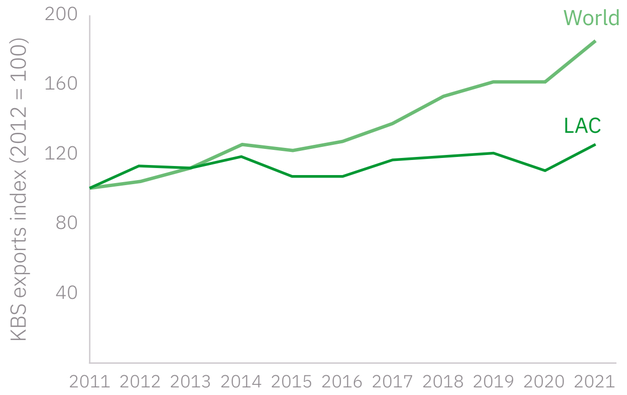
# International benchmarks point to a large service export opportunity

The focus of LAC (Latin America and Caribbean) countries on basic commodities exports has resulted in missed opportunities in terms of Knowledge-Based Service (KBS) exports. Over the past decade, LAC KBS exports showed slower growth compared to the rest of the world. While LAC's KBS exports grew by 25% from $39B in 2011 to $49B in 2021, the rest of the world experienced a growth of 90% during the same period, increasing from $1,640B to $3,047B. This meant that the region's share of the global market went down from 2.4% to 1.6%, a far cry from the region's 8.3% share of the global population.

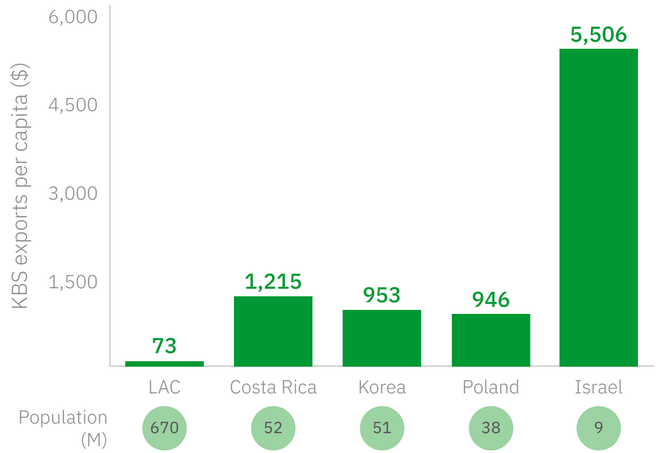
However, certain LAC countries have successfully shifted their focus towards KBS, providing inspiration for the rest of the region. Jamaica achieved a remarkable export growth rate of 446% over the past decade, followed by Uruguay with 392%, Costa Rica with 283%, and the Dominican Republic with 287%.

To gauge the potential, it is worth noting that, on average, LAC's per capita KBS exports amounted to $73, while Costa Rica reached $1,215, Poland $946, and Israel $5,506. Based on international experience, we estimate that LAC could increase its KBS exports by approximately $100B over the next decade. The investments made in training facilitated by AI would yield nearly immediate payback.

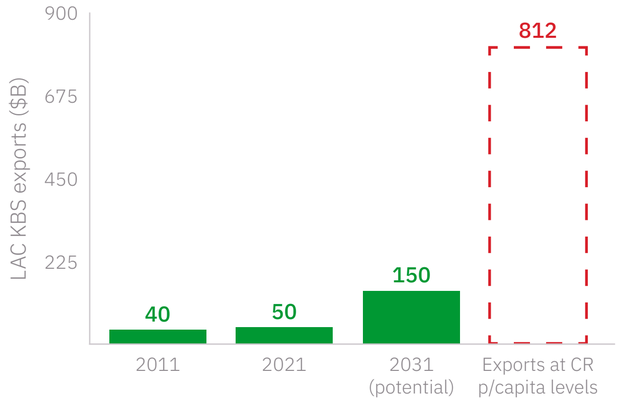
LAC is falling behind the world in KBS exports



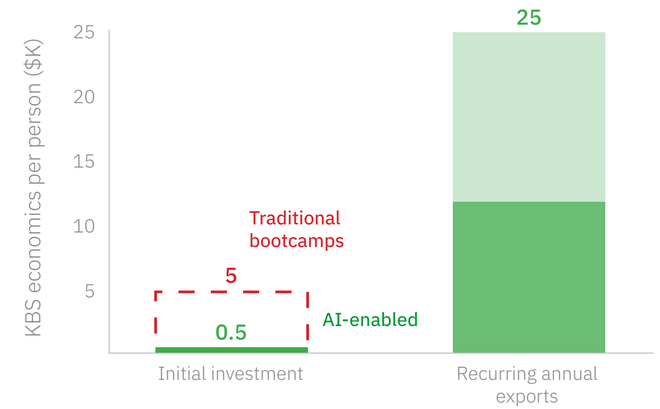

LAC has very low KBS exports per capita




LAC has huge untapped KBS export potential




KBS training has immediate payback




*Source: WTO, Surfing Tsunamis analysis*

# LAC could use AI to assist low-income citizens

LAC governments could leverage AI to improve the lives of citizens. India is already leveraging the latest AI technology to serve low-income segments of the population. The Ministry of Electronics and Information Technology is developing a ChatGPT-powered WhatsApp chatbot that will have access to all government information, support 12 languages, and provide voice notes to assist users who are not familiar with typing on cell phones. The app will help low-income farmers determine their eligibility for government programs.

The CEO of Microsoft, Satya Nadella, fully endorsed the initiative, stating that *"I grew up in India, dreaming every day that the industrial revolution would be equitably distributed across the world. Here, I witnessed something profound—an impactful innovation developed by the team at OpenAI on the West Coast of the United States just months ago, now being utilized by a local developer to make a difference in the lives of rural farmers. This experience gives me and, I believe, all of us in our industry a profound sense of purpose. It is truly remarkable to witness such progress. Now, our focus lies on scaling this solution and expanding its reach."*


*Sources: TechCircle, CNBC, Microsoft, India Today, Surfing Tsunamis analysis*

# LAC can create new industries and boost development with Deep Tech startups

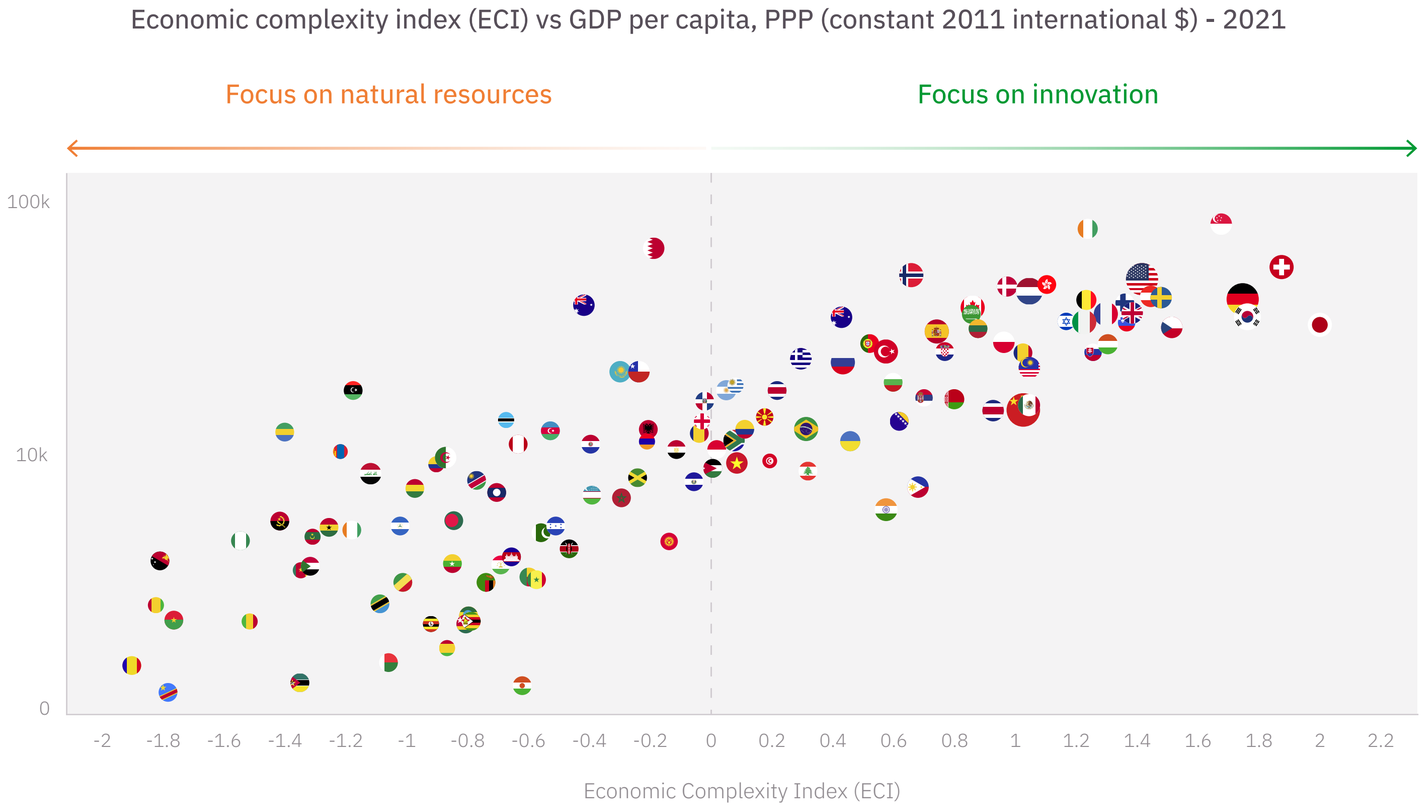
To prosper and succeed, LAC requires an effective development paradigm. Leaders in LAC often prioritize natural resources in their development agendas. However, evidence clearly demonstrates that sustainable growth and development lies elsewhere.

Economic complexity, measured by the diversity and added value of a country's exports, drives GDP per capita growth. Economic complexity is in turn closely linked to innovation, which drives the emergence of new sectors and fosters economic complexity, ultimately leading to prosperity, inclusion, resilience, and sustainable development.

The Deep Tech revolution presents an unprecedented opportunity for LAC countries to establish new industries that enhance lives by providing superior market solutions. As we will explore, creating Deep Tech startups from LAC has become increasingly accessible, and innovators across the region are establishing numerous startups to address global markets.

The growth potential is immense; the regional Deep Tech startup ecosystem has the potential to expand by 100 times in the future. Realizing this potential can boost R&D activities, halt or even reverse the brain drain, and transform the region.

## Economic complexity drives prosperity




*Source: Our World in Data, Observatory of Economic Complexity, Surfing Tsunamis analysis*

# LAC startups are developing amazing Deep Tech innovations

Establishment Labs

Breakthrough innovations for breast health, breast aesthetics, and breast reconstruction

Bioceres Crop Solutions

Fully-integrated provider of crop productivity technologies designed to enable the transition of agriculture towards carbon neutrality

NotCo


AI used to make plant-based food that looks, smells and tastes the same as animalbased

STÄMM

Biotech facility down-sized into an all-in-one, plug & play 100x more efficient desktop unit bioreactor

SATELLOGIC

Scalable earth observation platform with the ability to remap the entire planet at highfrequency and high-resolution

Moolec

Real animal proteins but grown in plants used as an alternative to develop food ingredients

puna.bio

Extremophiles used in biological inputs for agriculture to restore soil, increase yields and reduce emissions

FeedVax

Oral vaccines for fish, easy to use, cost effective for the producer, zero stress for the fish, without antibiotics

ZIPPEDI

Robotics and data analytics for retail and consumer goods inventory management

kingo

Distributor of prepaid solar energy service in rural communities without access to the grid

*Sources: Company websites, Surfing Tsunamis analysis*

# Building Deep Tech startups from LAC is easier than ever

Despite skeptics, we view the LAC Deep Tech startup ecosystem as a glass half full, rapidly filling up.

Several LAC-specific factors are catalyzing its growth. These include a burgeoning pool of skilled researchers and engineers, cost arbitrage for technology development, lower early-stage valuations promising high returns, and leveraging LAC's immense biodiversity. An increasingly robust support system, including accelerators, VC funds, university programs, and government policies, further bolsters this growth. Success stories serve as proof of concept, while an emerging replicable LAC Deep Tech business model offers a roadmap for new startups.

Moreover, creating born-global startups from emerging countries is easier than ever. These startups have access to the same tools and information as their counterparts in developed markets. Faster, more cost-effective innovation cycles and cheaper innovation tools also reduce capital requirements, further dimishing potential disadvantages with startups from other regions.

**The glass is filling up: factors driving the growth of LAC's Deep Tech startup ecosystem**

**$1M**
is the current value of $600 invested in the first round of Bioceres in 2001

**72%**
gross average return of SOSV investments in LAC startups (2015-2023)

Attractive early stage valuations

Availability of large talent pool

Lower talent costs than in developed markets

Growing investor ecosystem

Opportunity validated by initial success cases

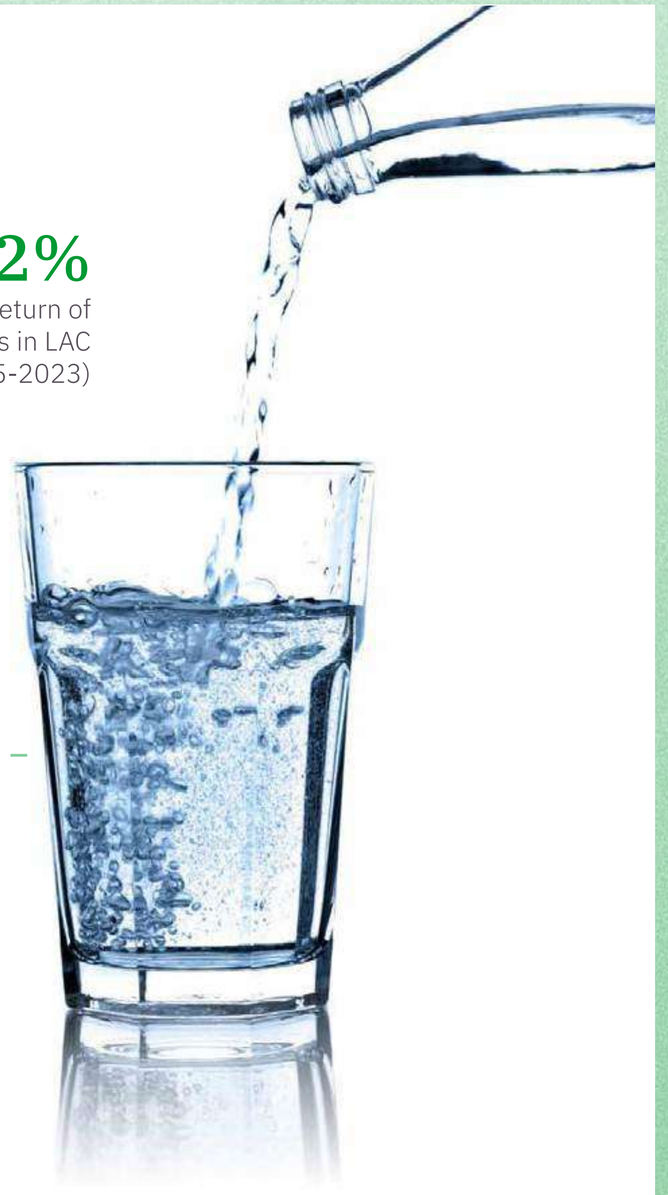
Emerging LAC Deep Tech business model

Lower risk due to faster and cheaper innovation cycles

Opportunity to leverage LAC's biodiversity

Flat world: new tools enable born-global startups

Massive opportunities for disruption and value creation



*Source: SOSV, Bioceres, Surfing Tsunamis analysis*

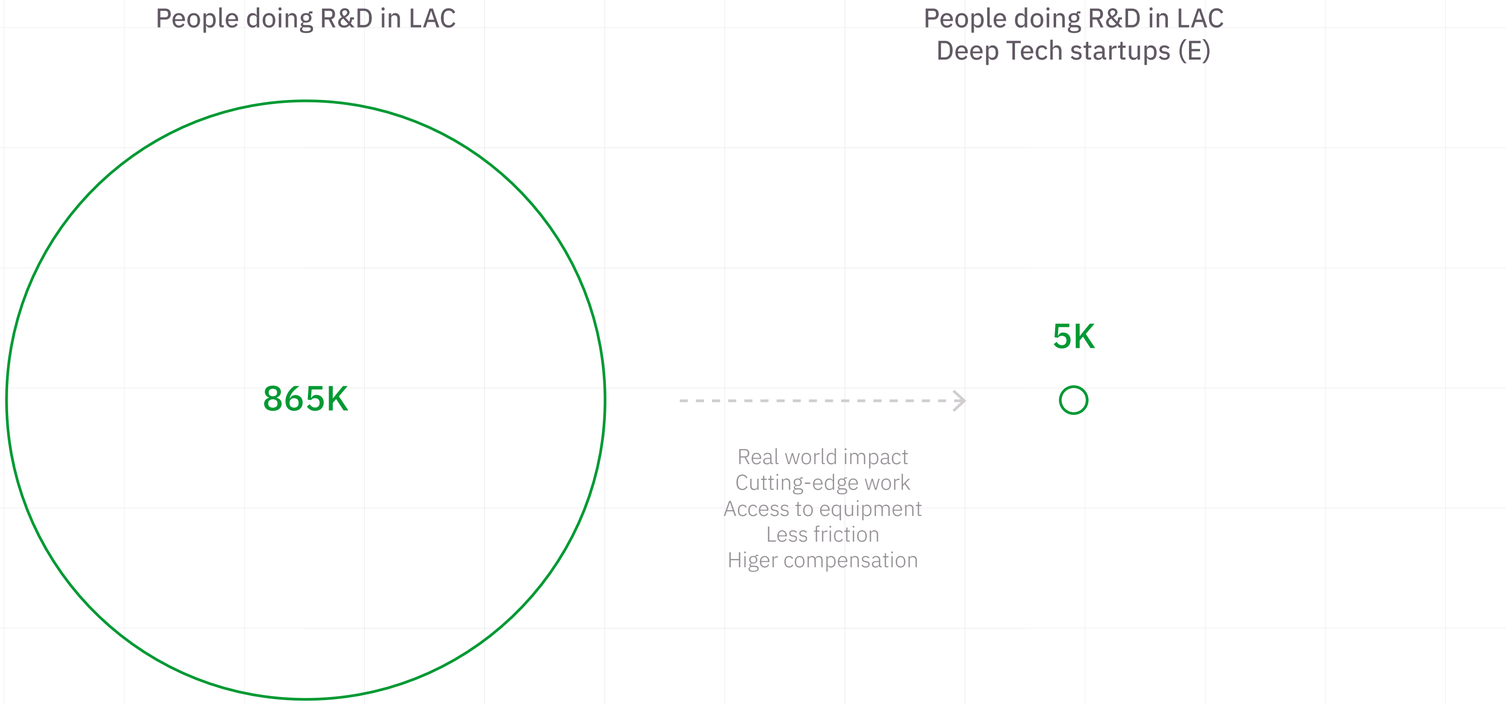
# LAC R&D talent pool enables huge growth potential

Latin America and the Caribbean (LAC) startups have access to a substantial pool of research and development talent. Today there are aproximately 865K individuals engaged in STEM R&D in the region. However, less than 5,000 (0.6%) have joined the ranks of Deep Tech startups.

Transitioning from academic research in government-sponsored centers to working in Deep Tech startups offers multiple benefits for these individuals. Startups are driven by real-world impact, and enable them to engage in cutting-edge work with agility, devoid of bureaucratic obstacles. Additionally, startups provide access to adequate equipment and generally offer higher compensation.

Consequently, we believe new startups will continue to attract affordable talent in the years to come. As demand and competition increase, compensation will rise, encouraging more young individuals to recognize the value of pursuing STEM careers.

**Number of researchers and technicians doing STEM R&D in LAC**




*Sources: GridX, RICYT, Surfing Tsunamis analysis*

# LAC has over 1.3M people doing R&D, 69% in STEM

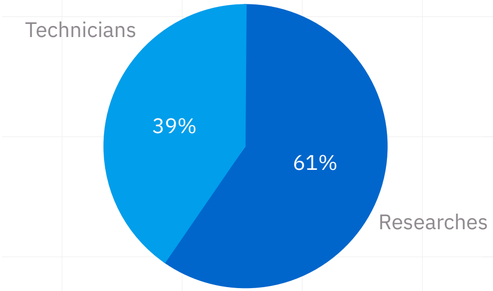
LAC boasts a substantial reservoir of research and development (R&D) expertise. The R&D community of 1.3M people and primarily consists of researchers (61%, the rest being technicians), with a notable representation of talented female professionals alongside the majority of males (58%).

The individuals dedicated to STEM research represent 69% of the total pool and encompass various fields, including natural sciences (22%), engineering and technology (18%), medicine (15%), and agriculture (11%).

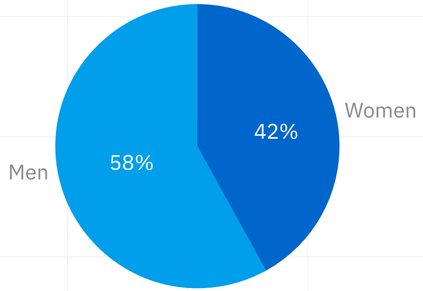
A significant majority holds advanced qualifications, with 40% possessing doctoral degrees (PhDs) and 30% holding master's degrees. These highly qualified individuals predominantly serve in academic institutions (73%) and private enterprises (18%), while a smaller proportion (8%) contribute directly to government organizations. The majority of professionals in this domain are below 55 years of age (76%).

## Breakdown of STEM researchers and technicians doing R&D in LAC

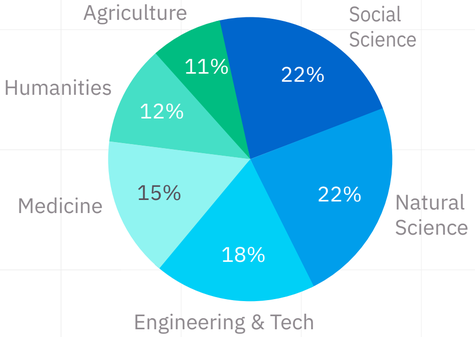
### Headcount



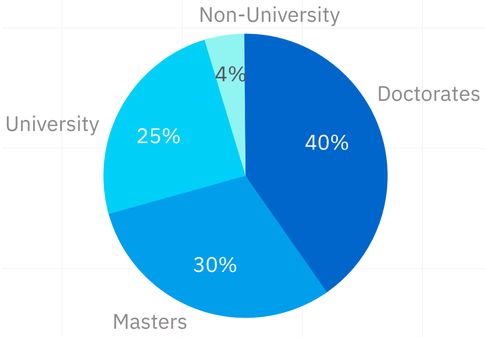

### Sex



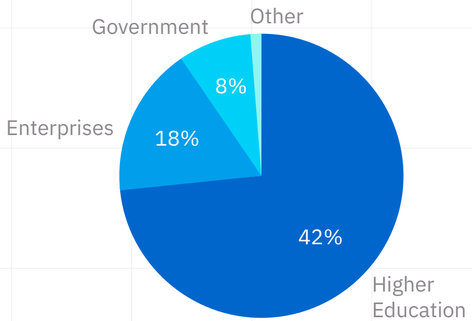

### Focus



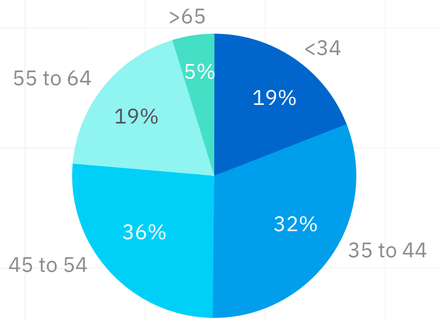

### Highest level of education




### Employment sector




### Age




*Sources: RICYT, Universidade Federal do Espirito Santo, Surfing Tsunamis analysis*

# LAC has a 5-10x cost advantage for R&D

Deep Tech startups entail significant upfront investments in research and development (R&D). Historically, these investments required extensive laboratories and expensive equipment. However, the focus has increasingly shifted to human capital.

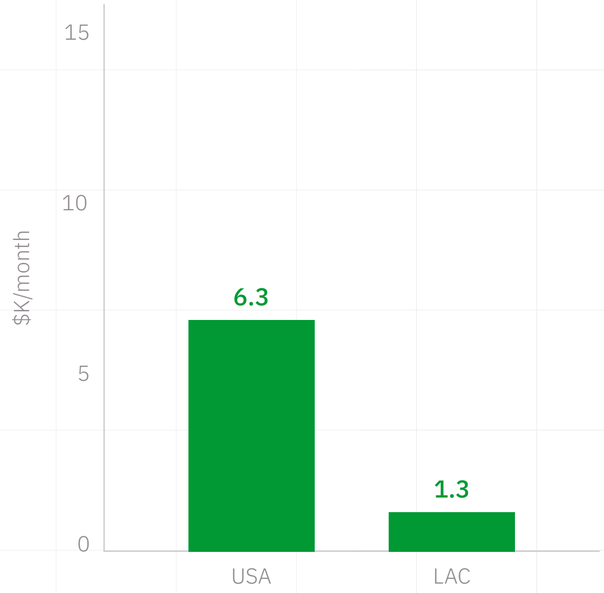
In this emerging landscape, LAC startups possess a crucial cost advantage compared to their counterparts in more developed markets. Our interviews with founders and venture capitalists confirm this viewpoint. A young electronic engineer, capable of contributing to a cutting-edge space startup, can be employed at a fraction of the cost compared to a similarly skilled peer in the United States (around $6.3K per month in the US versus $1.3K per month in select countries in Latin America and the Caribbean). For biology PhDs, the disparity increases even further, with costs being nearly tenfold higher in the US ($12.0K per month) compared to certain countries in the region ($1.2K per month).

Reduced costs translate into higher potential for value creation, mitigated risk, and decreased funding requirements.

**Cost advantage of doing LAC-based Deep Tech R&D**

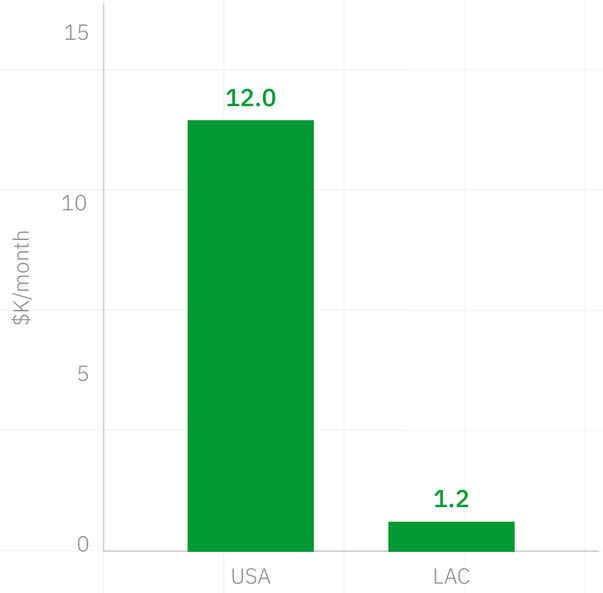
**~5x**

Cost advantage relative to US in the cost of a young **electronic engineer**




**~10x**

Cost advantage relative to US in the cost of a young **Biology PhD**




*Sources: Glassdoor, Payscale, Salary, Euroinnova, CNPQ, CONICET, FAPESP, market interviews, Surfing Tsunamis analysis*

# LAC startups are finding a model to achieve success

Deep Tech startups from Latin America and the Caribbean (LAC) are adopting international best practices and create new operational and business models to overcome regional innovation challenges.

While traditional Deep Tech startups from the region focused on incremental solutions for local markets, VCs are now guiding and funding startups that target global markets with transformative technologies. This shift demands robust IP protection in key global markets, particularly the US, instead of solely relying on protection in their home markets as was common in the past. To attract later-stage international investors, startups establish holding companies in jurisdictions known to be secure and favored by global VCs, such as Delaware in the US.

In recent years, successful startups have recognized the importance of rapid market entry and have built their businesses around a beachhead market that serves as a stepping stone towards their ultimate vision. In many cases, founders find it necessary to be closer to major markets where they can access investors to fund their growth. However, they continue to conduct most of their R&D using talent based in LAC to benefit from lower costs.

Overall, this model bears resemblance to the one that propelled Israel to become a thriving “Startup Nation.” While it would be ideal for more elements of this model to be rooted in LAC, the current approach serves as a highly effective working solution with a substantial multiplier effect.

**Key elements of emerging business model of Deep Tech startups from LAC**


*Sources: Surfing Tsunamis analysis*

# Private sector Deep Tech activity can boost R&D's contribution to GDP

LAC could accelerate economic growth by boosting private sector R&D with its Deep Tech startups. Today, LAC invests only 0.7% of its GDP in R&D, while Israel invests more than 5.4%.

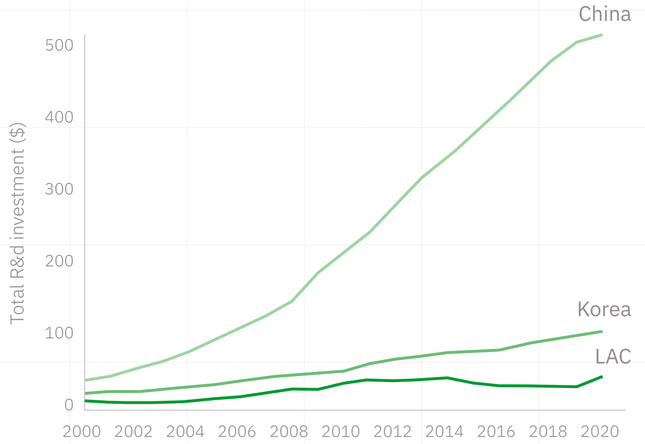
LAC R&D activity grew by 294% in the past 20 years. But other regions implemented deliberate policies to grow at a much faster pace. China, for example, saw R&D activity grow by four times faster (1,286%) during the same period. The share of GDP represented by R&D in LAC remained stagnant at 0.7%, while in Korea it more than doubled reaching 4.8% of GDP.

International experience clearly shows that the private sector is the most important driver to increase R&D penetration in the GDP. While private sector R&D represents only 43% of LAC R&D activity, in leading countries such as Israel it represents more than 80%.

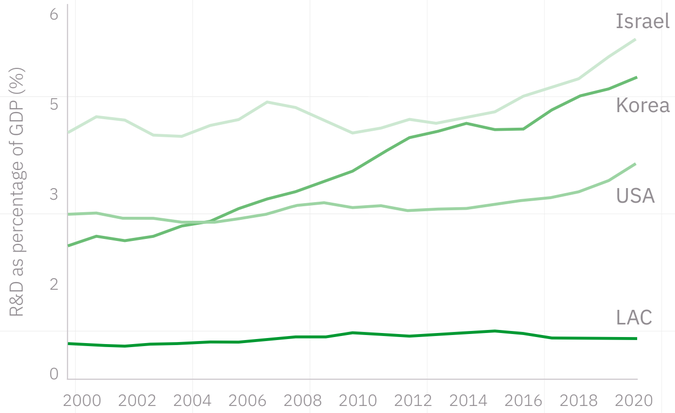
Unfortunately, traditional LAC companies mostly don't seem to have the incentives and know-how to invest significantly in R&D, but Deep Tech startups do. That means that private R&D in the region is set to grow and that governments around the region could fuel GDP growth by creating tax schemes and matching fund programs similar to those found in the most successful countries. To minimize the economic burden and promote greater social equity, governments could shift the focus of their policies from grants to interest-bearing reimbursable funds, as Israel does in its various programs.

## Indicators that point to a higher opportunity for private R&D in Latin America

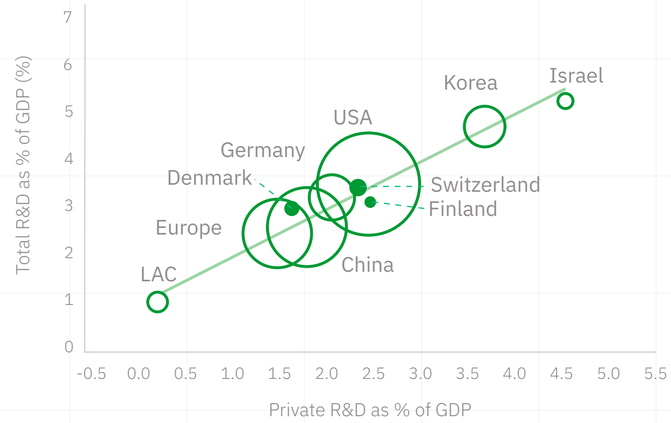
LAC's total R&D investment lags behind other regions



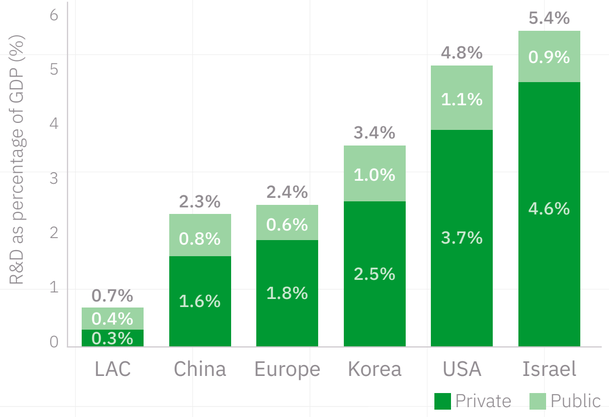

LAC's R&D share of GDP is stagnant while others grow




Private R&D is a driver of total R&D as percentage of GDP




Large opportunity to grow private sector R&D in LAC




*Sources: OECD, Statista, RICYT, Surfing Tsunamis analysis*

*Image: Space X*

**Chapter 3**

# LAC’S DEEP TECH ECOSYSTEM IS TAKING OFF

# The LAC Deep Tech ecosystem is already underway

Latin America and the Caribbean (LAC) are in the early stages of developing a promising Deep Tech ecosystem. While it's still early days, the region has already established the initial foundations necessary for a thriving startup ecosystem in this field.

Remarkably, LAC is currently home to 340 startups that have collectively received $2.2B in venture investments and generated over $8B in value. To put this into perspective, these figures are larger than the entire LAC startup ecosystem in 2010. That ecosystem grew exponentially from a value of $7B in 2010 to an impressive $221B in 2020.

Of the 340 startups we analyzed, 98 have a valuation over $10M, including 12 that are worth more than $100M. Among these, three startups - Establishment Labs (Costa Rica), NotCo (Chile), and Bioceres (Argentina) - have valuations exceeding $500M.

These figures validate the potential for the creation of successful Deep Tech companies in LAC, despite the ecosystem being in its early days. The region has already laid the groundwork for an exciting future in this emerging field.

**340**
Startups that raised funding from VCs and accelerators

**$8B**
LAC Deep Tech ecosystem value

**$2B**
Total capital raised

**$24M**
Average value per Deep Tech startup

**98**
Companies worth over $10M

**3**
Deep Tech companies worth >$500M

*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# Most of LAC Deep Tech startups concentrate in Argentina, Brazil and Chile

Deep Tech startups that have received institutional funding are spread across 14 countries in all LAC sub-regions. Initial startup activity is concentrated in Argentina, Brazil, and Chile, which account for 80% of the total. However, when we consider the value of the ecosystem, the distribution shifts. Brazil, Costa Rica, Chile, and Argentina collectively account for 90% of the region's Deep Tech ecosystem value.

We have identified 65 funds and accelerators investing in Deep Tech startups within the Latin America and Caribbean (LAC) region. Of these, 15 are based within the region and are devoted to the sector.

The most valuable company in the region (Establishment Labs worth $1.8B) is based in Costa Rica, a country of just 5 million inhabitants. This highlights that even smaller countries can achieve significant success in Deep Tech, provided they have the right environment and policies in place.

Eight sectors with a value exceeding $100M have been identified. Among these, the biotech sector stands out. It hosts the highest number of startups (61%) and leads in value creation, contributing 42% of the regional ecosystem value. This prominence of biotech aligns with the substantial number of biotechnology researchers in the region and the sector's synergy with food and agriculture value chains.

**14**
Countries with Deep Tech startups with institutional funding

**8**
Sectors that are valued at over $100M

**65**
VC funds with at least one investment in Deep Tech in LAC

**15**
Funds and accelerators focused on Deep Tech in LAC

**90%**
Argentina, Brazil, Chile and Costa Rica's share of LAC ecosystem value

**42%**
Biotech's share of ecosystem value Tech startup

*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# A larger universe of Deep Tech startups are not investor ready

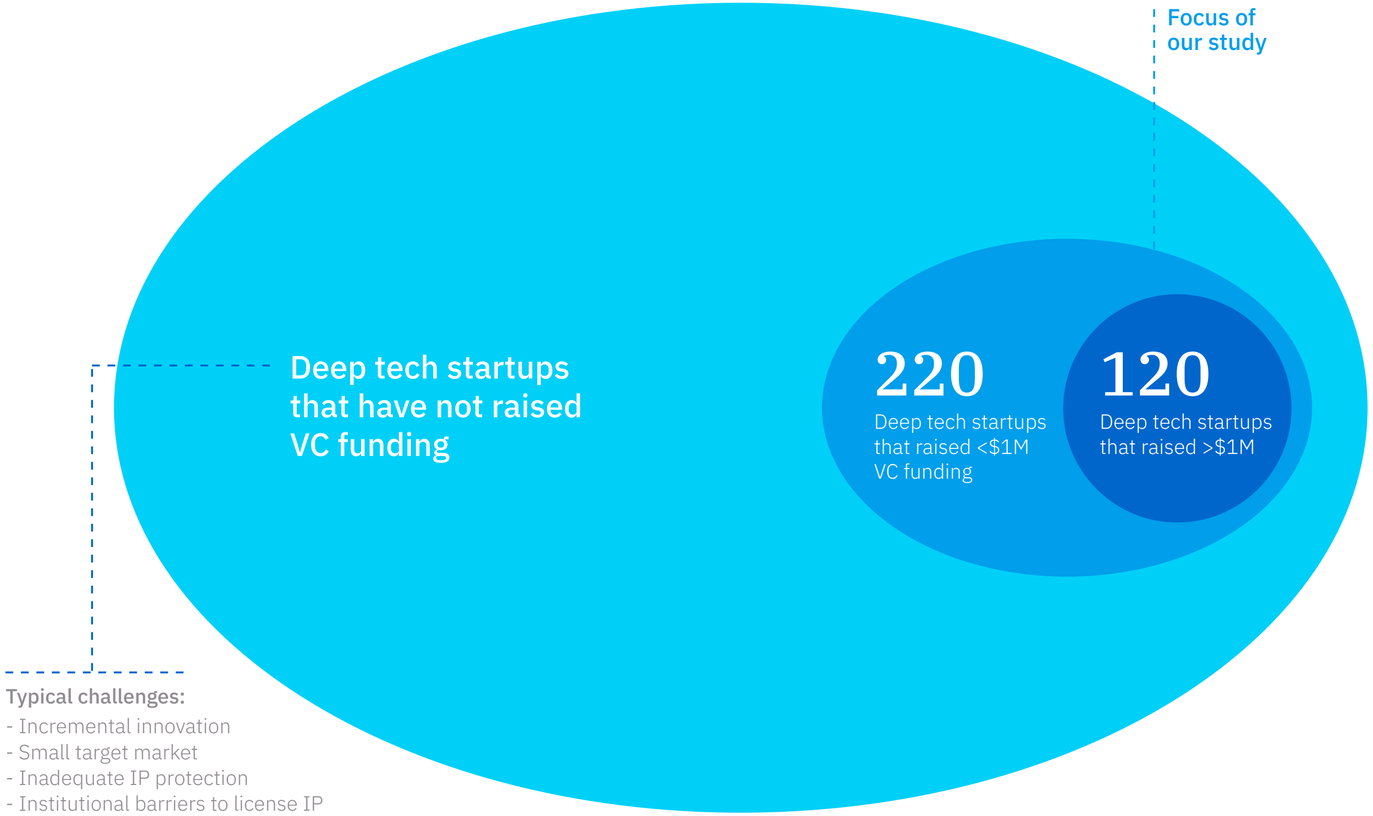
Through our research, we have uncovered 340 Deep Tech startups that received institutional investments. Among them, 120 already raised more than $1M. Based on the 2021 Tecnolatinas report, we can infer that Deep Tech companies represent roughly 10% of the regional startup ecosystem.

Our analysis indicates there is a larger universe of companies that have not received venture funding, typically because they do not meet the criteria for investor readiness. The challenges they face include focusing on introducing incremental innovations to local markets, lack of business and communication skills, institutional barriers to license their intellectual property, inadequate IP protection and unclear pathways to commercialization.

While these companies contribute to the ecosystem, particularly in terms of talent availability and supplier base formation, their social and economic impact remains limited due to their lack of capital and market reach necessary for scaling.

In some cases, Deep Tech companies can achieve remarkable success without institutional capital. They do this by leveraging their ability to innovate and delivering truly valuable solutions to large markets that sustain their growth. However, such companies are the exception rather than the norm.

## A larger universe of Deep Tech startups are not investor ready



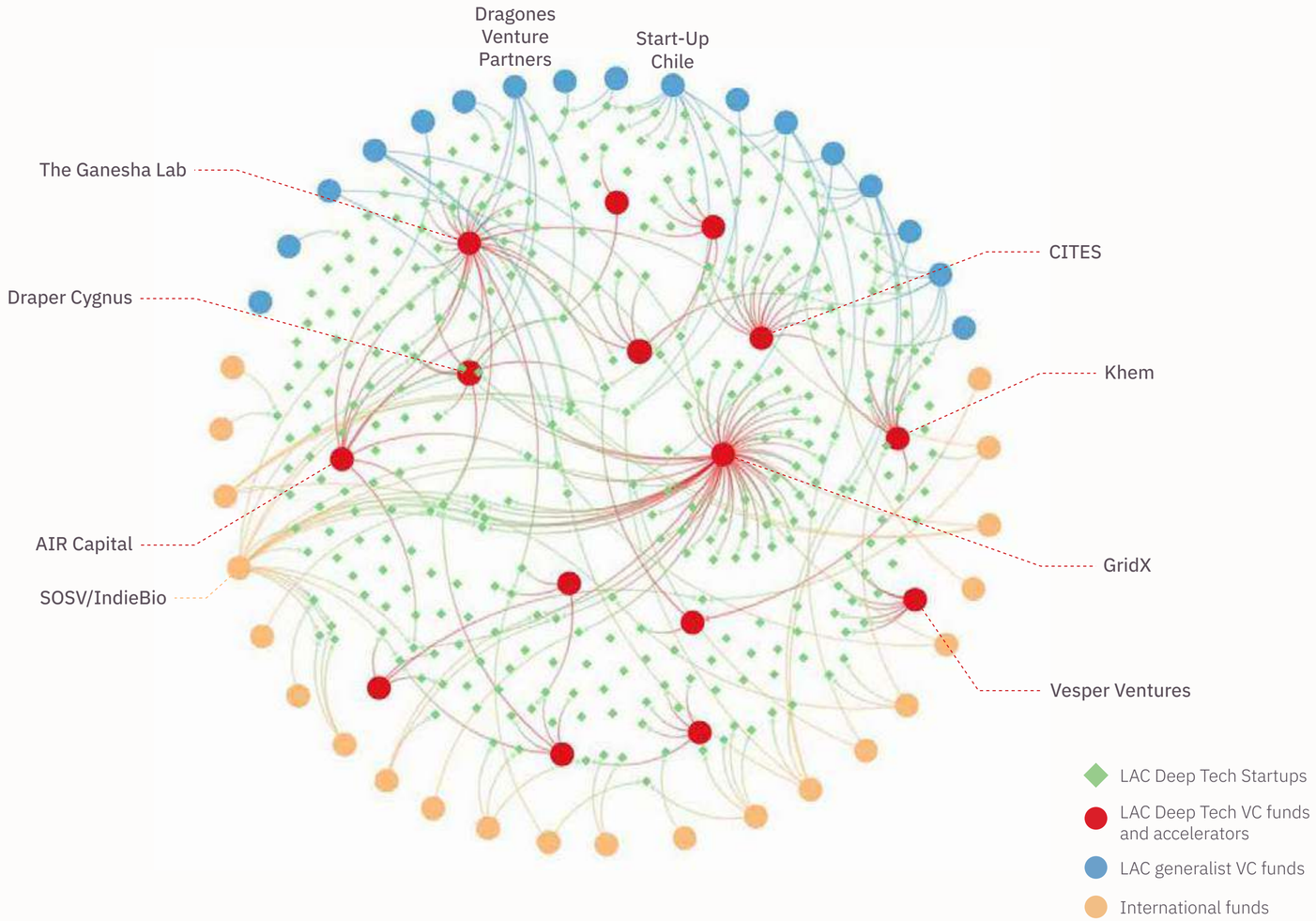

*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# The ecosystem begins to present a rich network of startups and investors

The graph depicts all investor-backed startups in the ecosystem using small diamonds, represents investors with orange pentagons and maps the connections between them with lines. A cluster of LAC investors focusing on Deep Tech startups are at the center of the graph, playing a vital role in the ecosystem. Notably, two early-stage investors, GridX (with 56 startups) and The Ganesha Lab (with 28), are actively nurturing the ecosystem with a substantial deal pipeline. Other investors, both regional and international, occupy the outer regions of the graph and contribute with a smaller number of investments, but in some cases of higher value.

An exception to this pattern is SOSV/IndieBio, a leading global fund in the biotechnology space. This fund has invested in 30 startups from the region and plays a prominent role in its development. Notably, their significant contribution includes investing in NotCo, one of the most successful startups in the ecosystem that was missed by funds from the region.

## LAC Deep Tech startup and investor ecosystem map




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# The Deep Tech startup revolution has reached 14 LAC countries

Fourteen countries in the Latin America and Caribbean (LAC) region are already the birthplace of investor-backed Deep Tech startups. These countries encompass all the sub-regions of LAC, demonstrating that the Deep Tech opportunity is relevant for the region as a whole.

Argentina, Brazil, and Chile account for the majority of startups (30%, 30%, and 19%, respectively). These countries boast well-developed venture capital ecosystems and harbor a significant concentration of researchers specializing in Deep Tech-related fields. In upcoming years, we anticipate that Mexico and Colombia will gain larger influence and new countries will build ecosystems of their own.

Chile, Brazil, and Argentina also play a central role when it comes to total startup valuation (representing 25%, 23%, and 23% of the aggregated value of startups in the region respectively). But Costa Rica stands out with the fourth most valuable ecosystem, which represents 22% of the ecosystem value in the region, showing that the benefits of the Deep Tech revolution extend beyond larger countries.


*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

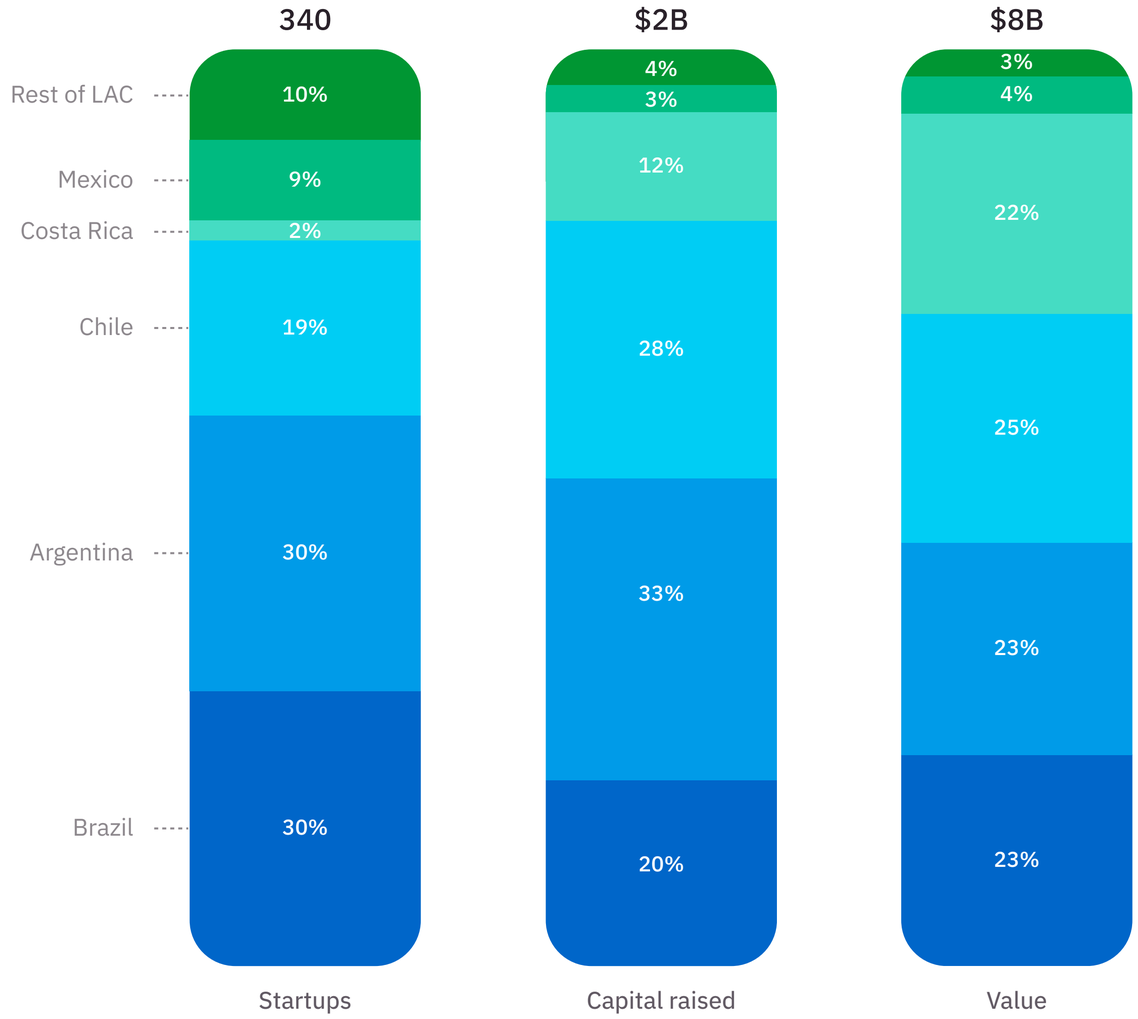
# Almost 80% of LAC's Deep Tech activity is currently concentrated in 3 countries

As shown in the graph, Brazil, Argentina, and Chile are at the forefront of the Deep Tech landscape in the LAC region, accounting for 79% of startups, 81% of the capital raised, and 71% of the ecosystem value.

In contrast, Mexico presents lower levels of startup activity, making up 9% of startups, and smaller portions of capital raised (3%) and ecosystem value (4%). The remaining LAC countries collectively comprise 10% of Deep Tech startups, 4% of the capital raised, and 3% of the regional ecosystem value. Colombia is notably trailing, with only 3% of startups and less than 1% of the value in the regional ecosystem.

This concentration of activity in a select few pioneering markets aligns with patterns observed in the broader LAC technology ecosystem. For instance, Argentina played a pivotal role during the early days of the dotcom and mobile revolutions but later saw a decline in early-stage activity and venture capital funding. It is anticipated that similar patterns will emerge in the Deep Tech revolution, as investors and innovators identify and exploit untapped opportunities, driving increased activity in other countries.

## LAC's Deep Tech ecosystem country comparison




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

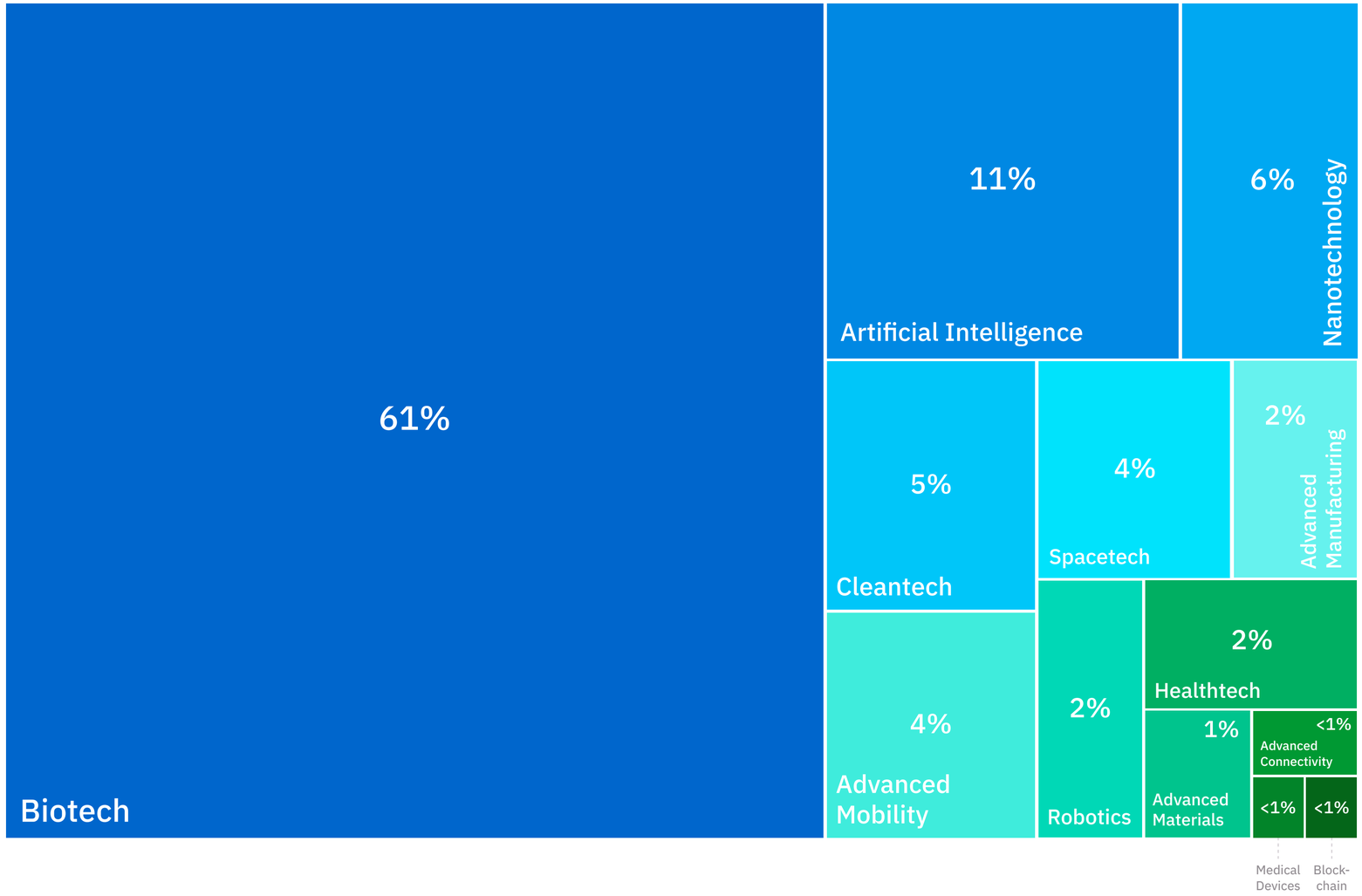
# Biotech and AI concentrate 72% of LAC Deep Tech startups, but other sectors are emerging

Biotech represents the largest share (61%) of Deep Tech startups in the LAC region. The second most active sector is Artificial Intelligence (AI), accounting for 11% of startups engaged in Deep Tech innovation. Here, we specifically refer to startups startups that use AI to address complex challenges, such as developing plant-based alternatives to animal products that are both appealing and nutritious.

Other emerging sectors include nanotechnology (6% of startups), Cleantech (5%), spacetech (4%), advanced mobility (4%), robotics (2%), advanced manufacturing (2%), health tech (2%) advanced materials (1%), medical devices and others (<1%).

Biotech is poised to remain a prominent field due to its connections with food and agriculture, the availability of biodiversity, and the abundance of talented professionals. However, advances and decreasing costs in core platforms such as reusable rockets, AI, self-driving cars, solar panels, and humanoid robotics are expected to foster further growth and diversification across various technologies, by making these technologies more accessible and feasible for startups from LAC countries.

## Percentage of LAC Deep Tech startups by technology sector




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# Biotech leads most of the Deep Tech activity in LAC

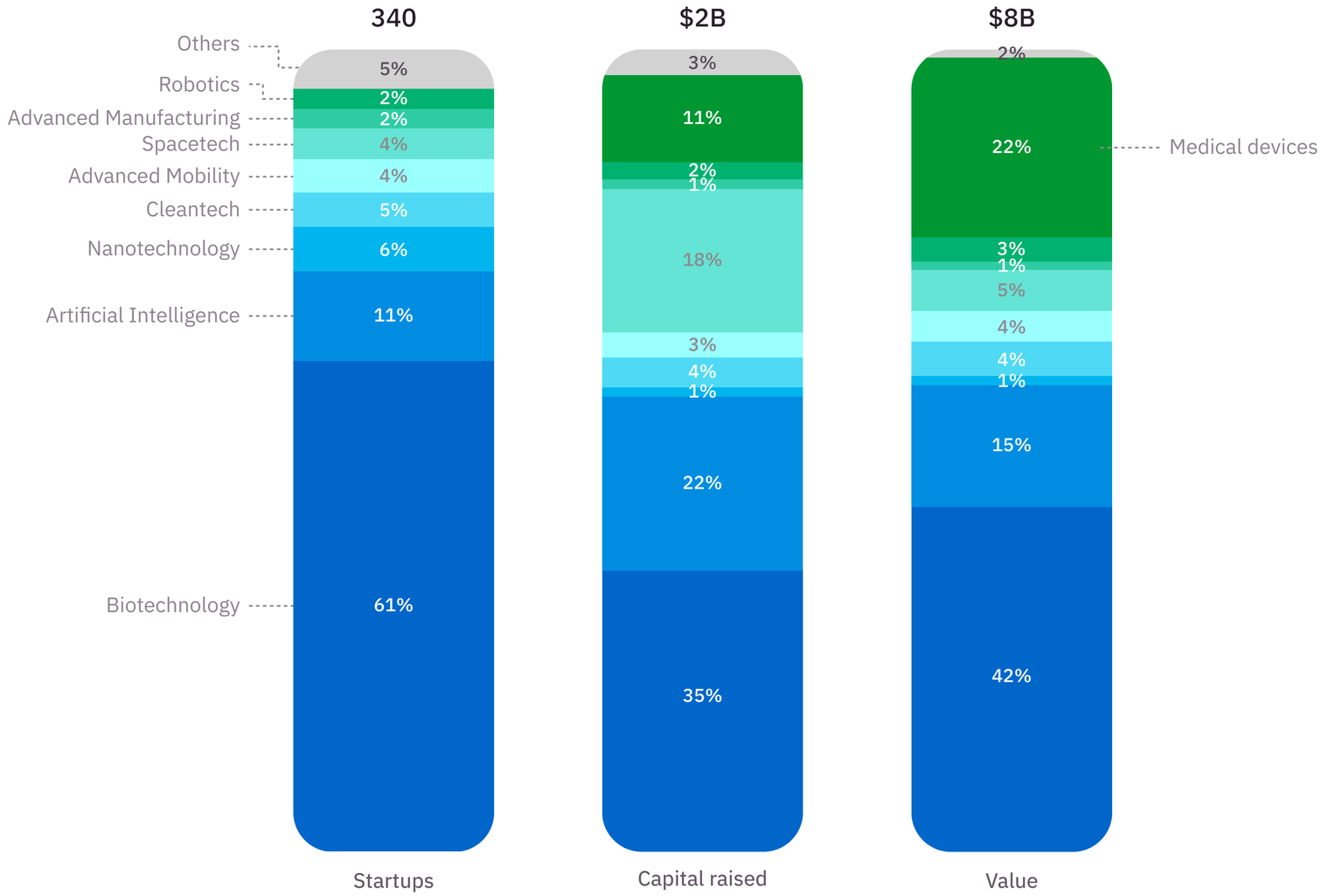
The region encompasses a broad range of technology sectors, including biotech, medical devices, AI, Cleantech, Spacetech, advanced manufacturing, advanced mobility and robotics.

Biotech leads in terms of startup activity, representing 61% of LAC's Deep Tech startups backed by institutional investors, and it accounts for a substantial portion of the ecosystem—comprising 35% of the capital raised and 42% of the total value.

The prevalence of biotech aligns with the region's abundant specialized talent in biological sciences, the international competitiveness of the agricultural sector, and the remarkable biodiversity that serves as a resource for researchers.

Following biotech, medical devices and AI are the next prominent sectors. Despite representing less than 1% of startups, medical devices account for 22% of value creation. AI comprises 11% of the startups and contributes to 15% of the value creation.

## Startups, capital raised and ecosystem value by sector




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# Biotech also leads LAC's Deep Tech ecosystem value, but its relevance varies by country

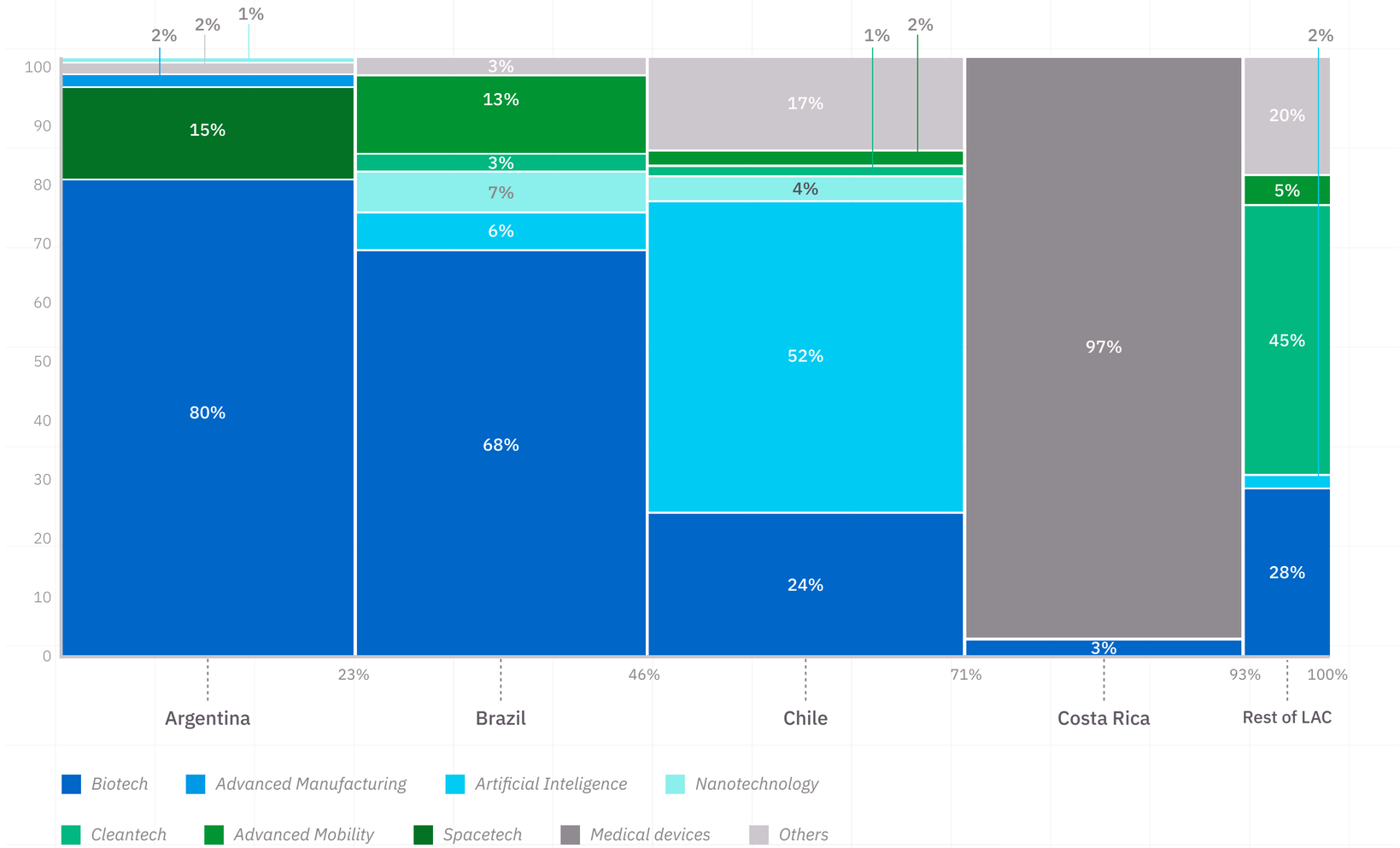
Biotech startups are the main value creators in the Deep Tech sector in Argentina (80%) and Brazil (68%). Additionally, biotech holds significant value in Chile (24%) and the rest of the region (28%).

Yet, the Deep Tech sector in these countries is not solely dominated by biotech. Other sectors contribute significantly to specific markets, highlighting the breadth of opportunities within Deep Tech. For instance, space startups, including Satellogic, contribute 15% to the value of Argentina's Deep Tech ecosystem. In Brazil, advanced mobility and AI constitute 13% and 7% of the aggregated value creation, respectively.

In Chile, Artificial Intelligence claims a larger share (52%), a figure greatly influenced by NotCo, which primarily utilizes AI technology in conjunction with biotechnology to develop plant-based foods. In Costa Rica, medical devices account for 97% of the ecosystem's value, largely due to the overwhelming success of Establishment Labs, a company known for its innovative breast implants.

Cleantech accounts for 45% of value creation in the remaining parts of Latin America and the Caribbean (LAC). This sector includes companies like Kingo Energy from Guatemala, which provides distributed renewable energy solutions to low-income families.

## Share of each Deep Tech's vertical value across countries




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# 83% of the Deep Tech startups are 10 years old or younger

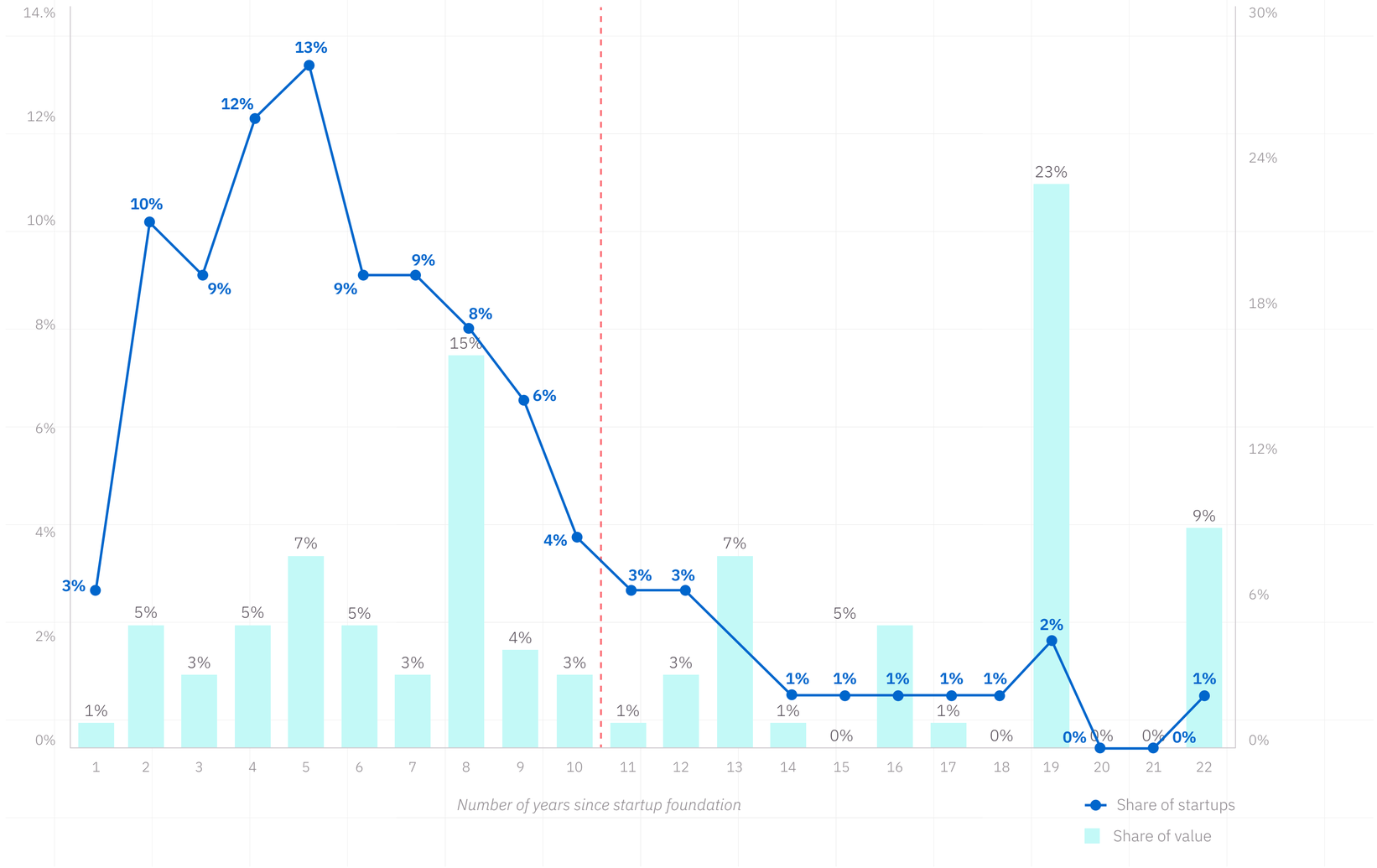
While LAC created a few Deep Tech pioneer companies like Embraer decades ago, the creation of Deep Tech startups at scale in the region is a new phenomenon. LAC's Deep Tech ecosystem primarily consists of young startups. The majority of investor-backed startups (83%) were established within the past 10 years.

For the purposes of this study we considered companies created since the year 2000. Only a small portion (6%) has been in existence for more than 15 years, most notably Establishment Labs and Bioceres.

The significant growth in cohort size over the past decade can be attributed to the rise of the LAC venture capital sector during that period and the lower cost required in recent years to create Deep Tech startups.

In terms of value creation, 51% of the overall ecosystem value was created by startups created in the past decade. The remaining value is mostly captured by a few successful older companies, particularly Establishment Labs and Bioceres.

## Deep Tech startups and ecosystem value broken down year of creation




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# 24 LAC Deep Tech startups already reached valuations greater than $50M

The most notable Deep Tech success story to date is Auth0, a cybersecurity company that was acquired by Okta from the US for $6.5B in 2021. Given that this company was acquired, we did not include it in our map of the regional ecosystem.

Today, there are 24 companies worth more than $50M in the Latin American and Caribbean (LAC) ecosystem.

The most valuable company in the regional ecosystem is Establishment Labs, a medical device company from Costa Rica listed on NASDAQ, valued at $1.8B. This company is followed by NotCo, a food technology company, and Bioceres, an agricultural biotechnology company, both valued at over $500M.

There are 9 companies in the $100-$500M range and an additional 12 companies in the $50-$100M range. Both Satellogic and Moolec, which are publicly traded companies, have recently seen a significant decrease in their valuations over the past year.

## LAC Deep Tech companies worth over $50M


*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

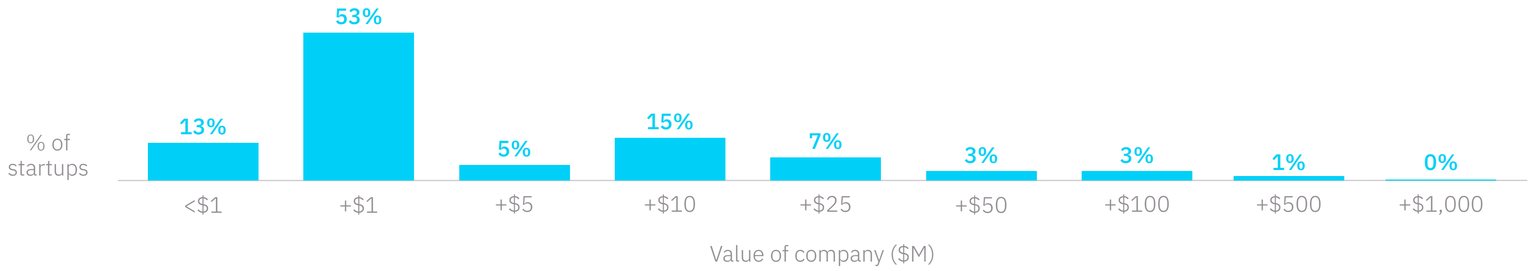
# 61% of the value is concentrated in early success cases

The vast majority of investor-backed Deep Tech startups are still in the early stages of development, with 71% of them having valuations below $10M. This represents a promising pipeline for venture capital funds to explore.

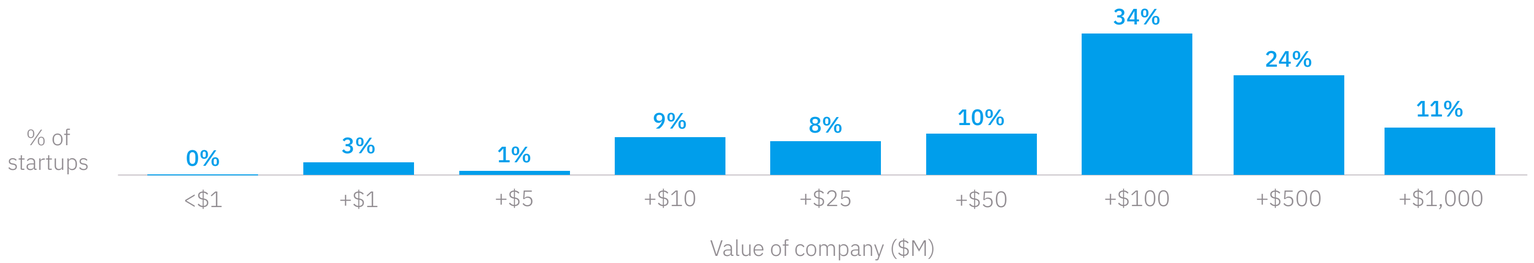
A small group of early success stories accounts for a significant portion of the ecosystem's value. Companies valued above $500M represent only 1% of the startups in the region but contribute to 43% of the total ecosystem value. When combined with companies valued over $100M, this figure rises to 61%.

This concentration of value is in line with the complex nature of creating globally successful startups. This is precisely why the portfolio-based venture capital model has proven pivotal and successful in establishing thriving startup ecosystems. The odds are inherently stacked against success for new startups, but when success is achieved, the returns can be substantial. For instance, the initial investors of Bioceres invested $600 each in the company, and today, that initial investment is worth $1M.

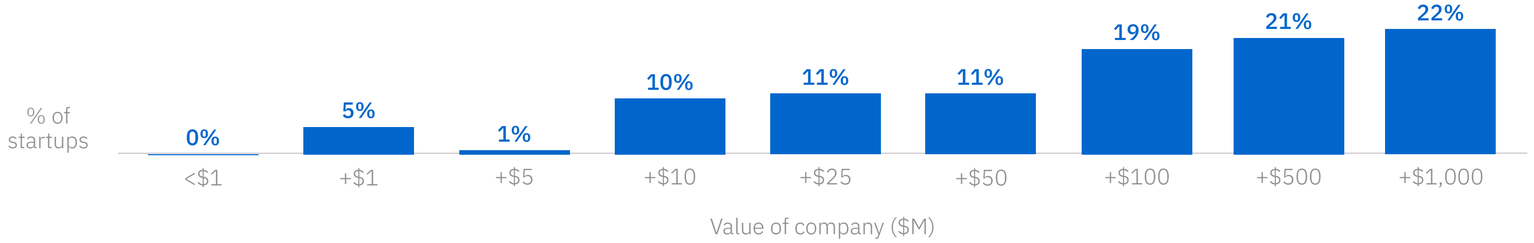
## Percentage of investor-backed startups by value bracket




## Percentage of capital raised by value bracket




## Percentage of ecosystem value by value bracket




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

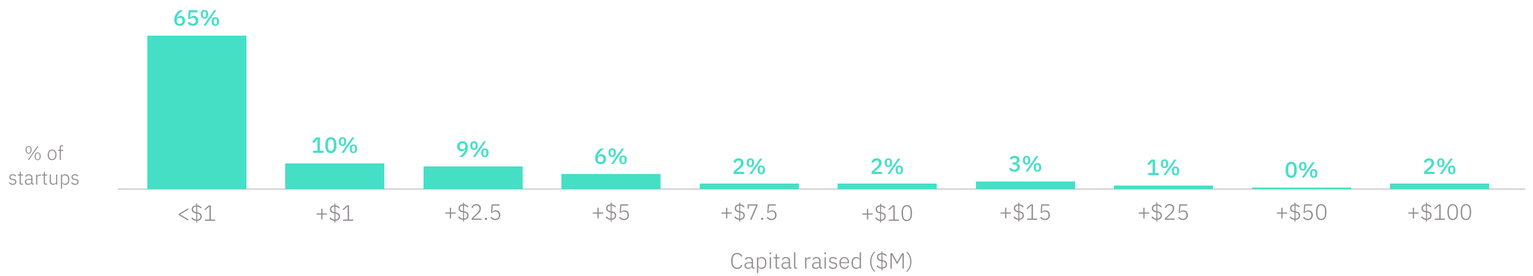
# 65% of LAC Deep Tech startups raised less than $1M

The majority (65%) of Deep Tech startups in Latin America and the Caribbean (LAC) are in the early stages of their development (Pre-seed and Seed), having secured less than $1M in funding.

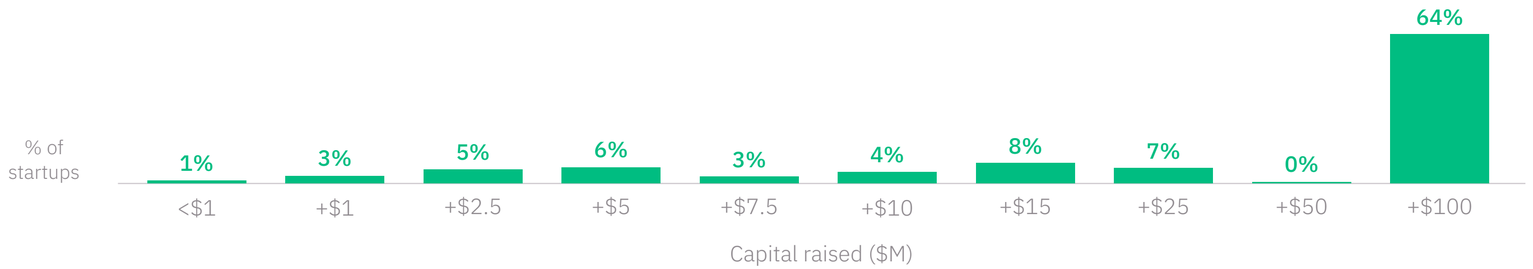
Only 6% of LAC Deep Tech startups have managed to secure investments over $10M. These figures highlight the the nascent state of the ecosystem and underscore the immense growth potential that venture capital activity holds within this dynamic landscape.

Interestingly, a significant portion of the capital raised within the LAC Deep Tech ecosystem (64%) is held by the top 2% of companies. These standout firms represent 55% of the ecosystem's total value. The disparity between value creation and capital raised is largely due to challenging market conditions, which led to a marked decrease in the value of some publicly-traded companies amid a climate of rapidly increasing interest rates over the past year.

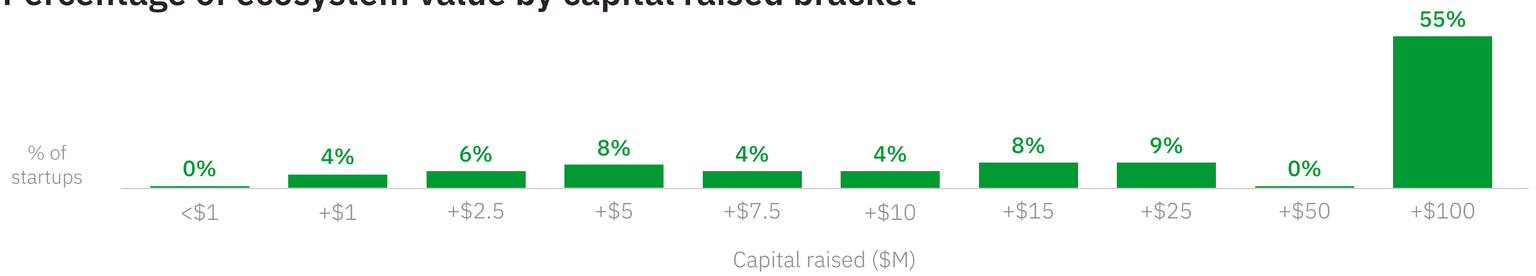
## Percentage of investor-backed startups by capital raised bracket




## Percentage of total capital raised by capital raised bracket




## Percentage of ecosystem value by capital raised bracket




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

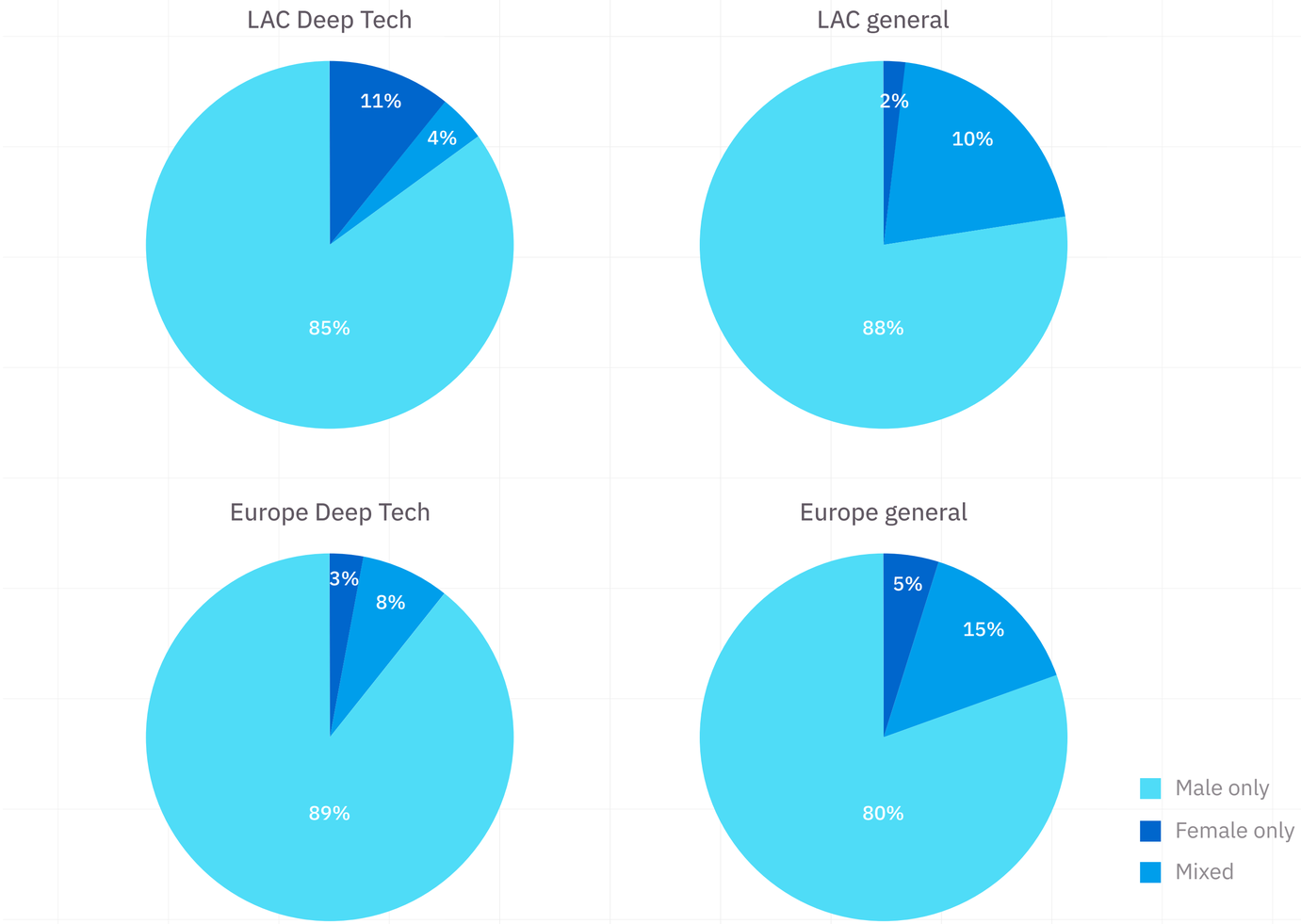
# Female entrepreneurs are more active in Deep Tech than in the broader LAC ecosystem

In the Latin America and the Caribbean (LAC) Deep Tech startup ecosystem, females are more represented among founders than in digital startups. Specifically, 15% of Deep Tech startups have female founders, with the majority (11%) being exclusively female teams. In contrast, the broader startup ecosystem sees a 12% representation of female founders.

Notably, female participation in LAC Deep Tech startups is also higher than in European counterparts, where only 3% of startups have female-only founders and total female participation stands at 11%.

However, there is still substantial room for growth. The current level of female participation is significantly lower than the 42% representation seen in LAC's researcher group, indicating a significant opportunity to further tap into the potential of female talent.

## Female founder representation in LAC Deep Tech startups vs. other ecosystems




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

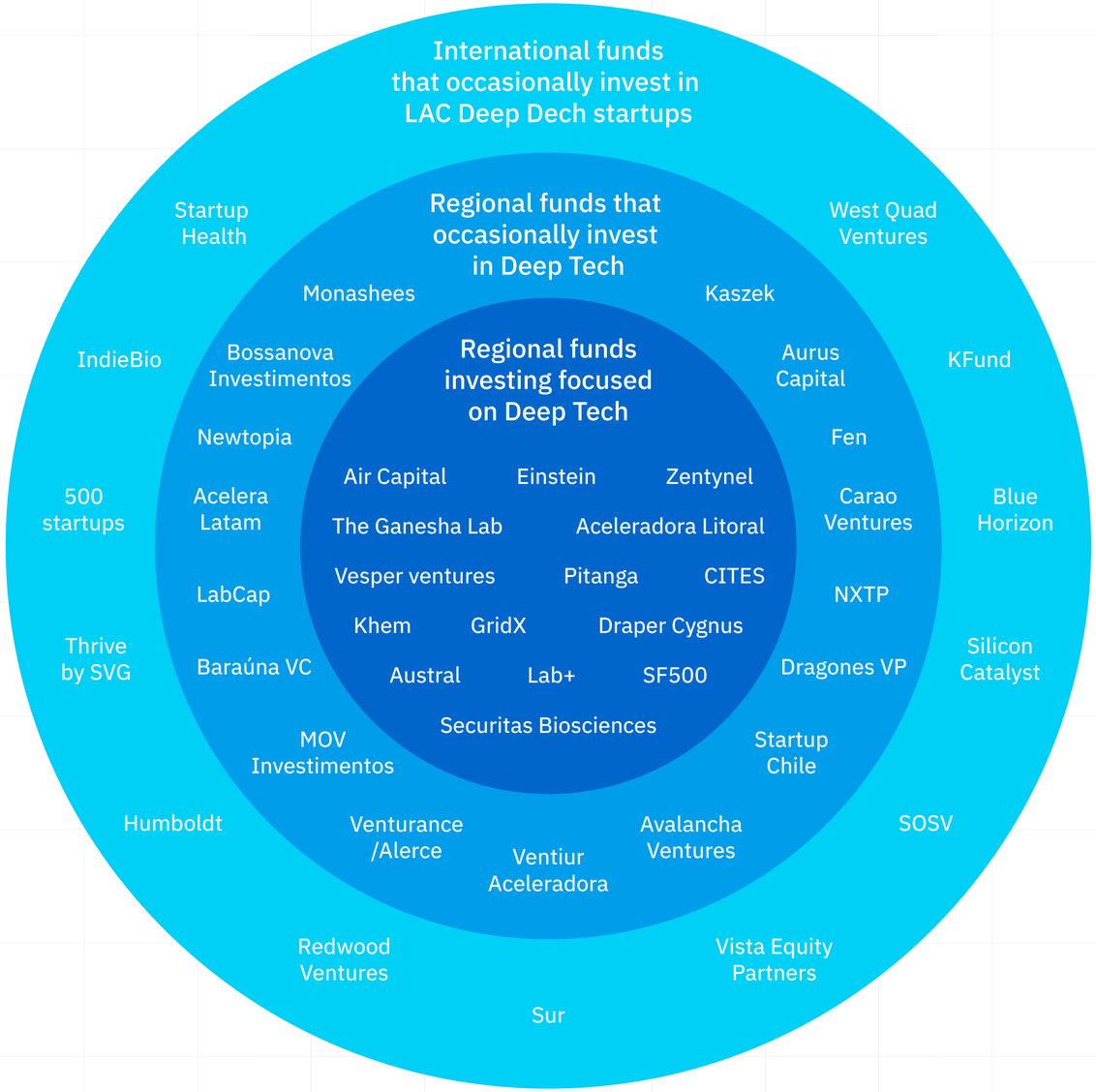
# LAC Deep Tech is supported by three tiers of venture investors

The investor landscape within the Latin America and the Caribbean (LAC) Deep Tech ecosystem can be stratified into three distinct tiers.

The first tier is made up of 15 funds that primarily invest in Deep Tech startups, dedicating over 50% of their portfolios to the sector. They typically focus on early-stage investment rounds such as Pre-Seed, Seed, and Series A. These funds generally collaborate with global counterparts to provide support for later-stage funding.

The second tier is composed of LAC-based funds that invest in Deep Tech startups on an occasional basis. Despite their investment strategies primarily targeting digital startups, they are open to exploring compelling opportunities within the Deep Tech sector. They do not actively aim to establish structured pipelines for Deep Tech startups, but remain receptive to potential opportunities that may arise.

The third tier involves international funds that have invested in LAC's Deep Tech startups. These funds, predominantly based in the United States, are instrumental in the growth and development of the ecosystem. They offer validation, access to funding and global markets, and impart vital knowledge and expertise, all of which are essential for the success of Deep Tech startups.




*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# There are 15 VC funds with focus on Deep Tech in LAC

Latin America and the Caribbean (LAC) already boasts 15 funds from the region with a focus on Deep Tech startups, making up half their portfolios. This indicates that the revolution is already underway, and dedicated ecosystems are emerging. However, it also emphasizes that these are still early days, and the potential for growth is immense.

Currently, LAC Deep Tech funds are concentrated in Argentina, Brazil, Chile and Uruguay. Argentina, home to seven dedicated funds, is initially leading the way. Argentina's traction in this space can be attributed to the availability of talented and cost-effective scientists, early achievements such as Auth0, Bioceres and Satellogic, and a government matching fund program.

On the other hand, Brazil and Mexico, which together account for a large portion of the LAC population, research and venture capital activity, have yet to fully tap into their potential in Deep Tech funding. Mexico lacks funds specifically focused on this space, while Brazil lags behind smaller countries like Argentina with only four funds dedicated to Deep Tech. We anticipate that investors will address this disparity in the coming years.

## LAC accelerators and VC funds focused on Deep Tech startups


*Note: We include in this analysis VC funds that focus 50% of their portfolios on Deep Tech startups*

*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# Deep Tech investors active in LAC by stage and profile


*Source: Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# Some LAC universities are actively promoting Deep Tech startups

Over the past decade, universities across Latin America and the Caribbean (LAC) have proactively ramped up their efforts to commercialize their intellectual capital. For instance, CORFO and Chilean universities have established three regional hubs to bolster tech transfer activities and more effectively bring their innovations to the market. A new startup called Trampoline is working to accelerate the process by creating a marketplace for intellectual capital.

Certain universities have also recognized the potential for transforming their research into valuable Deep Tech startups, an area of focus that involves emerging technologies with significant potential for impact. The Tecnológico de Monterrey in Mexico has launched numerous initiatives, such as technology parks, bootcamps, and efforts in targeted areas like medical devices and advanced manufacturing, aiming to invigorate startup activity.

Meanwhile, the Instituto Balseiro is promoting a dedicated annual competition for early-stage startups doing Deep Tech.

Taking the initiative even further, Universidad del Litoral partnered with private investors to create its own startup accelerator program. This mirrors successful models observed in top global universities, such as MIT, which established The Engine, and The Hebrew University of Jerusalem, with its multiple startup accelerators. Given the economic and societal benefits of such efforts, it's likely that other universities in the region will follow suit and replicate this ambitious approach.

## Select examples of LAC universities promoting the creation of Deep Tech startups


*Sources: Market interviews, Anprotec, Tecnológico de Monterey, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

*Image: IBM*

**Chapter 4**

# UNLOCKING DEEP TECH IN LAC

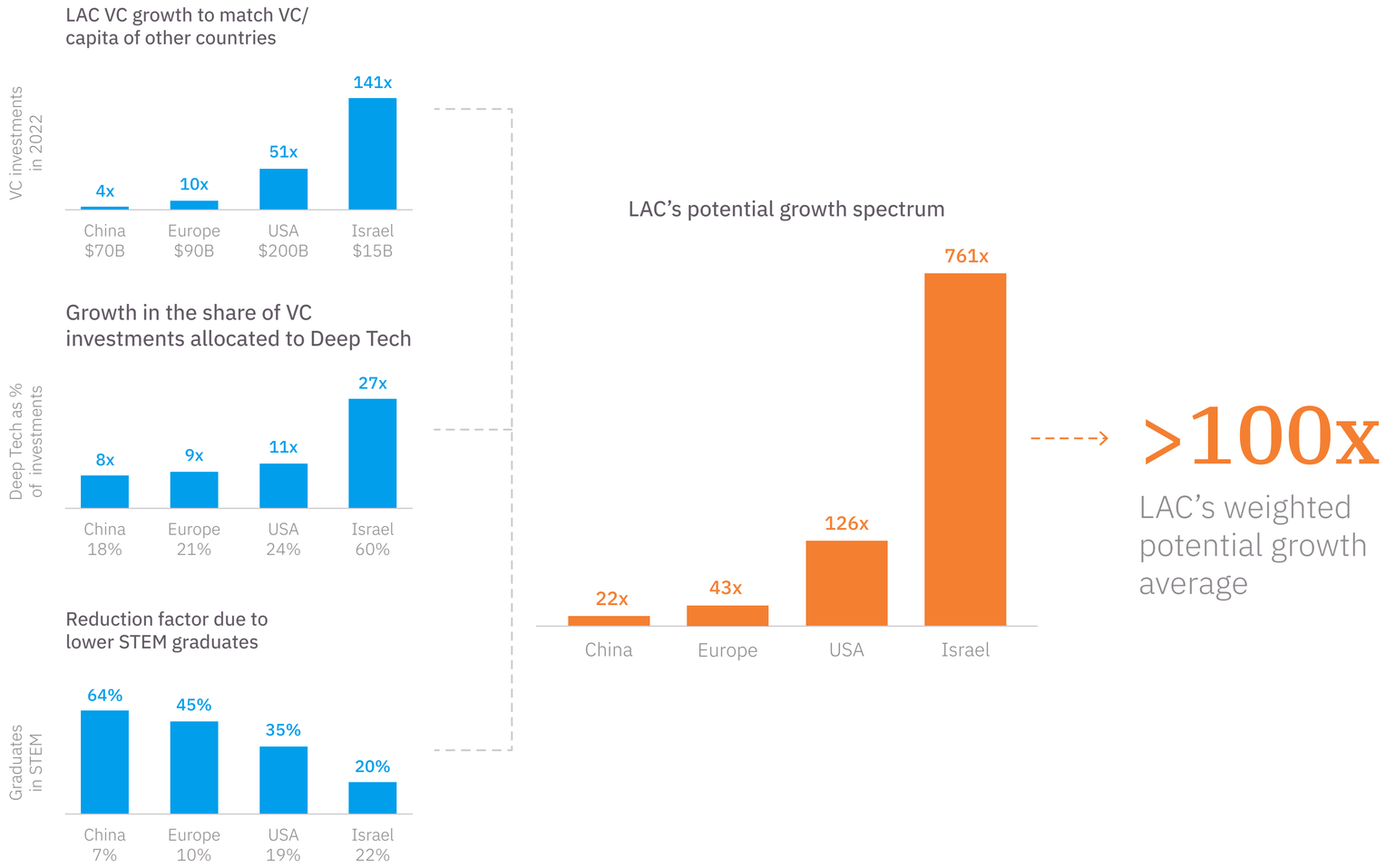
# Deep Tech in LAC can grow 100x by replicating proven models

The Deep Tech ecosystem in LAC presents the potential for massive growth. Our estimation suggests that venture capital investment in Deep Tech can grow by over 100 times in the long term.

This potential is driven by two factors and moderated by a third element. Firstly, overall venture capital investments per capita in LAC are much smaller than in other markets. To reach the per capita investment levels of China, we would need to invest 4 times more, 10 times more to reach Europe, 51 times more to reach the US, and 141 times more to reach Israel. Secondly, the share of Deep Tech investments in LAC's venture capital should grow by 8 times to 27 times to align with international standards. While Deep Tech currently represents 3% of LAC's venture capital investments, it constitutes 18% in China, 21% in Europe, 24% in the US, and an estimated 60% in Israel. Lastly, it is important to recognize that STEM graduates make up a smaller proportion of our population compared to other countries, leading to reduction factors ranging from 20% to 64%.

By combining these factors while assigning less weight to cases like China and Israel, we arrive at a long-term growth potential of 146 times. However, it is crucial to acknowledge that venture capital activity is growing globally, and the technology revolution will accelerate, suggesting an even higher potential.

## Analysis of LAC's long-term growth potential




*Sources: GridX, RICYT, Crunchbase News, Axios, IVC Researh Center, LAVCA, World Economic Forum, Israel21, Surfing Tsunamis analysis*

# 20x growth seems viable for next decade for LAC Deep Tech

While LAC's Deep Tech ecosystem has the potential to grow more than a hundredfold in the long term, this expansion will take time. Ecosystems need time to mature, investors and fund managers need to build confidence and improve their skills, support policies require time to be implemented, and an entrepreneurial culture needs to be cultivated.

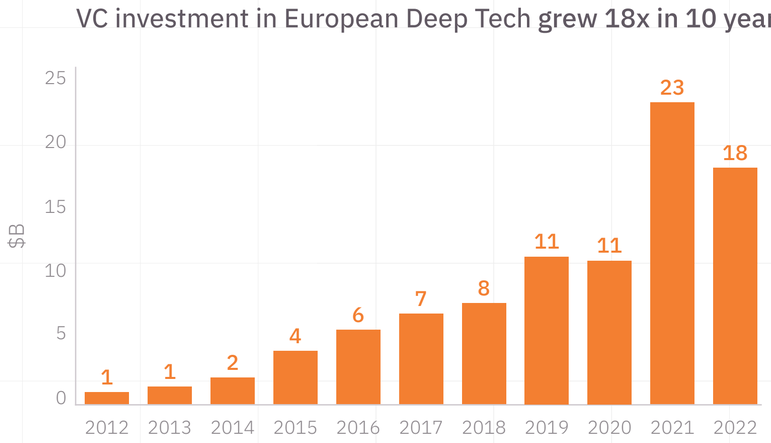
Over the next decade, our analysis shows there is room for a twentyfold increase in LAC Deep Tech venture capital investments. The number of startups and the value of the ecosystem can follow similar trajectories.

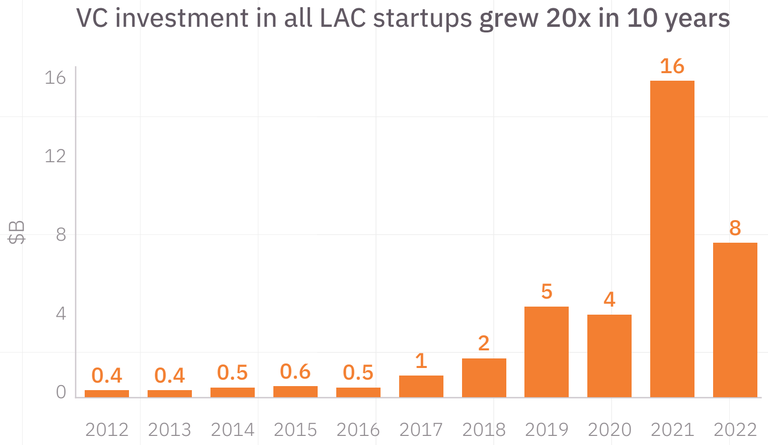
This estimate is based on three supporting trends. Firstly, venture capital investments in European Deep Tech startups grew by 18x over the past decade, from €1B in 2012 to €18B in 2022. Secondly, all venture capital investments in LAC rose from $378 million in 2012 to $7.8 billion in 2022 - or more than 20 times over a decade.

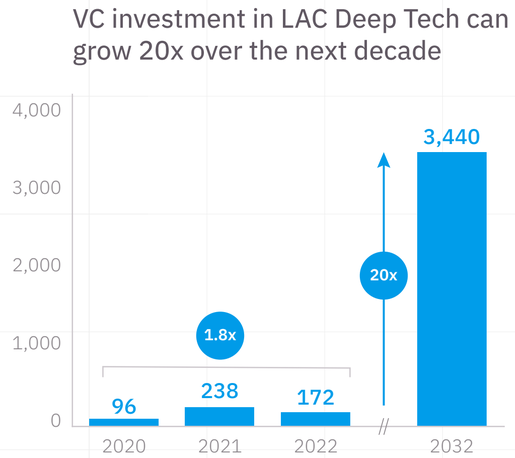
Finally, the trend aligns with the historical progression of Deep Tech investments in LAC. These grew from $96M (0.59% of total LAC venture capital investments) in 2020 to $172M (2.2%) in 2022, showing a solid upward trajectory that would be consistent with a growth of over 19 times over the next decade.

The Deep Tech sector offers great promise for the coming years, especially considering that the convergence of new technologies is only accelerating, creating further potential for growth. Of course, external factors, such as a sustained environment of high interest rates, could impact this potential. However, it is likely that structural factors that may hinder global economic growth will likely drive central banks to maintain lower rate levels once inflation is controlled.

## Analysis of LAC's growth potential over the next decade




*Sources: DealRoom, LAVCA, Surfing Tsunamis analysis*

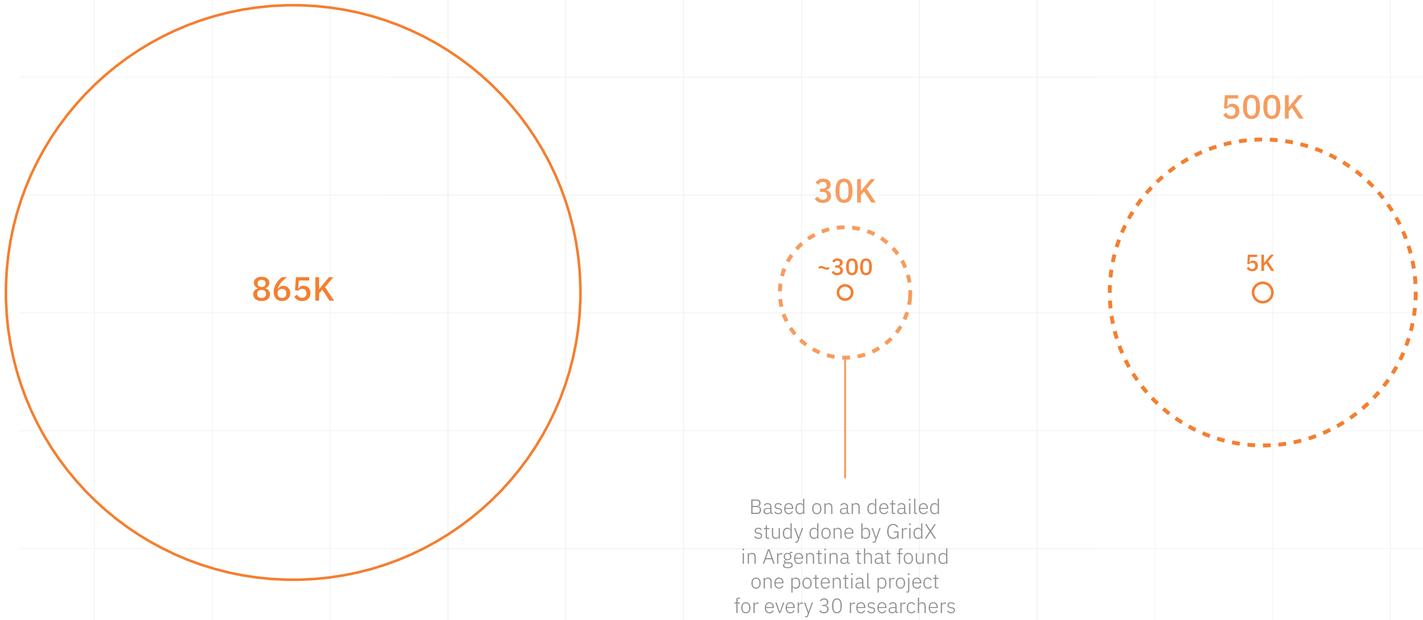
# LAC human capital pool enables 100x growth

Beyond the restrictions imposed by the lack of venture capital availability, the primary constraint to the growth potential of a Deep Tech ecosystem is the availability of qualified R&D talent, and LAC's ecosystem is far from reaching this limit.

Currently, there are approximately 10,000 employees in LAC's Deep Tech startups. As startups grow, they require more personnel in managerial, administrative, commercial, and production roles, reducing the percentage of employees dedicated to R&D. The specific proportion of researchers among these employees is unknown due to data limitations. However, based on our experience investing in the region's Deep Tech startups, we estimate less than half are engaged in R&D. This means that currently less than 1% of the people engaged in R&D in the region is employed by startups.

Even assuming a hundredfold growth in the number of startups and capital raised, there should still be room for expansion. This is particularly true considering the R&D sector itself will likely grow as the ecosystem matures, providing a continually replenishing talent pool.

## Talent pool required for 100x growth




*Sources: GridX, RICYT, Surfing Tsunamis analysis*

# Brazil has the biggest potential for Deep Tech ecosystem growth

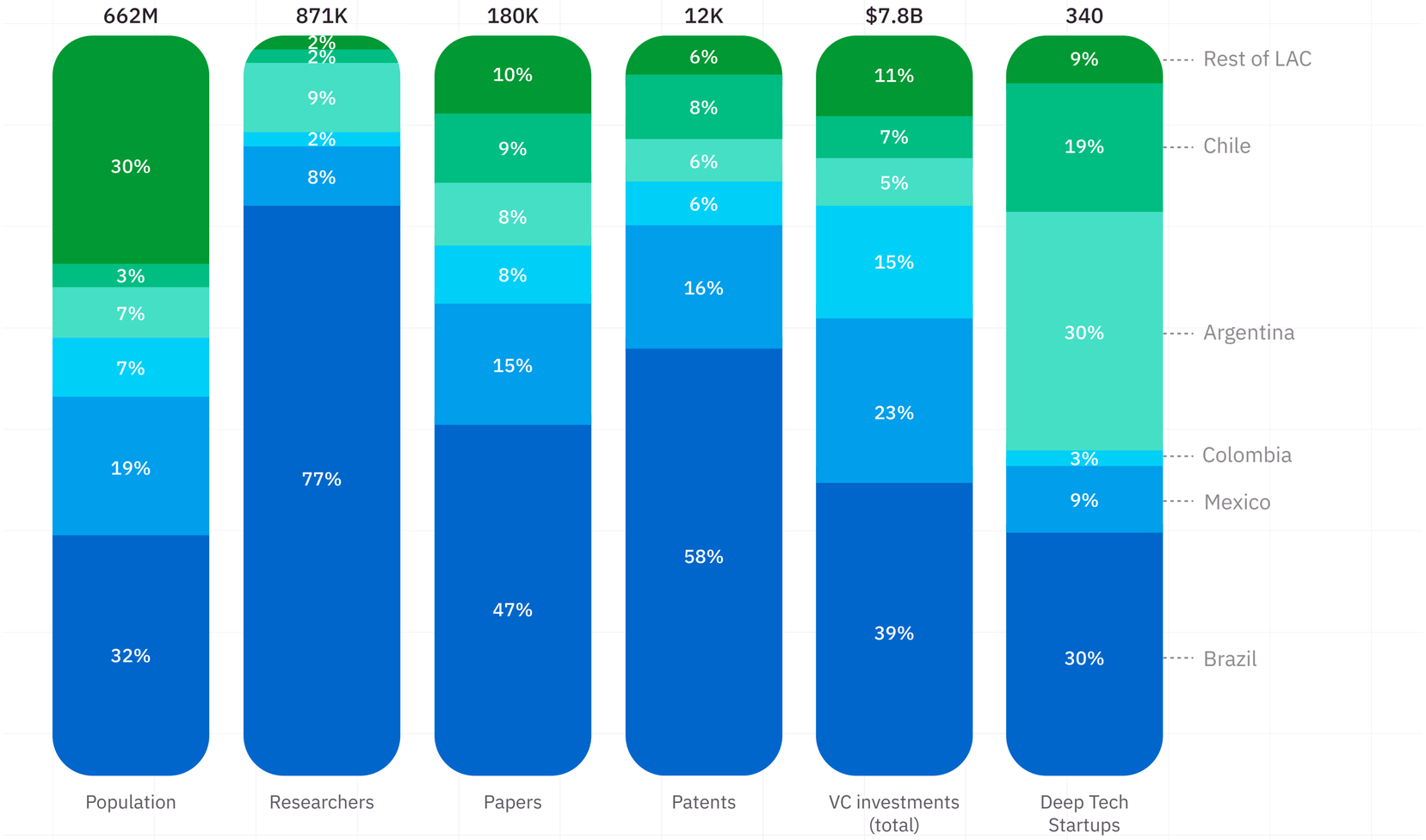
Argentina and Chile emerge as noteworthy pioneers in the regional Deep Tech startup landscape, accounting for 33% and 17% of activity, respectively. However, as other countries begin to realize their full potential, we anticipate a gradual decline in Argentina and Chile's relative share.

Brazil, Mexico, and Colombia, stand out by their untapped potential. While they represent 44% of the startups, they employ 87% of the researchers, contribute to 80% of the patents, and generate 70% of the scientific papers.

Among these countries, Brazil stands out with its substantial number of researchers (77% of LAC), paper contributions (47%), and patents filed (58%), yet it lags behind with only 33% of the startups. This discrepancy may be attributed, in part, to the digital startup model prevalent Brazil, which is focused onthe local market and requires a different mindset compared to the global nature of Deep Tech. But it is hard to imagine this problem will not be solved over time.

The untapped opportunity in the rest of LAC is also significant. Startup activity in the rest of LAC (7% of LAC) falls below the number of scientific papers published (10%), but the biggest opportunity in these countries lies in bridging the gap between the number of researchers (2%) and the population they represent (30%).

## Population, researchers, papers and patents per country in LAC




*Sources: WIPO, LAFCA, World Bank, RICYT, Surfing Tsunamis analysis*

# An integrated approach is needed to unlock Deep Tech potential

Unlocking the full potential of Deep Tech in Latin America and the Caribbean (LAC) entails overcoming a series of challenges. Some can be addressed to yield results in the short term (3-5 years), while others require longer periods for outcomes to materialize (over 5 years). These challenges span both the Deep Tech ecosystem and the broader societal context.

The immediate challenge for the Deep Tech ecosystem lies in converting the region's human capital into innovative startups that positively impact people's lives. We must also adopt and implement international best practices in ecosystem development. The region already showcases successful instances of such practices, hence, our focus should be on the systematic execution of these practices.

However, developing a Deep Tech ecosystem alone is insufficient. For meaningful, inclusive, and sustainable development, LAC society must make a forward leap. In the short term, we need to shift from a mindset of laggards and a resisting change to become savvy early adopters of life-enhancing technologies. In the long term, we must address challenges related to institutional frameworks, education systems, infrastructure limitations, and market environment paradigms that currently hinder large-scale improvements in the region's quality of life.

## Main challenges to unlock the full potential of Deep Tech in LAC


*Sources: Surfing Tsunamis analysis*

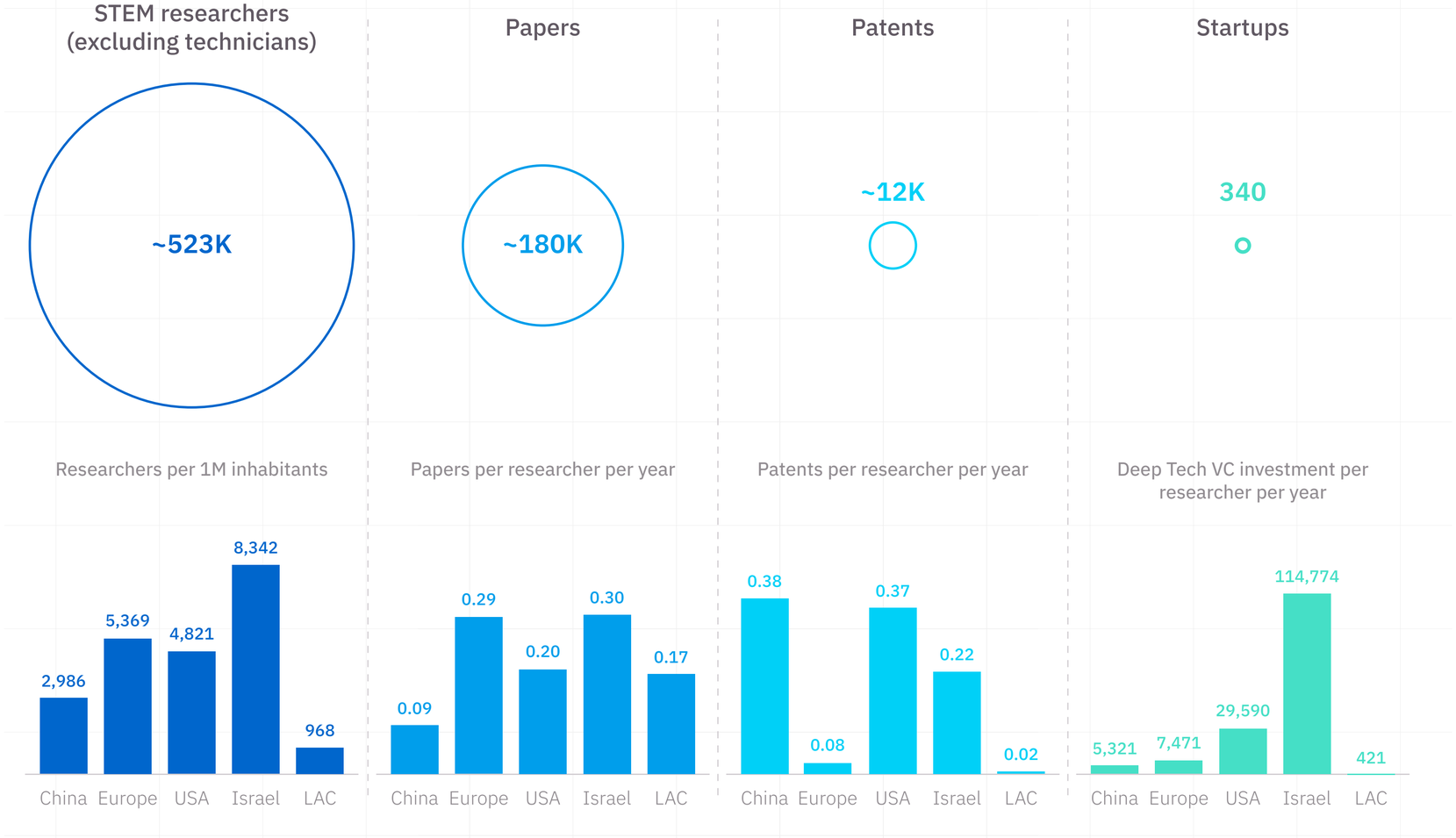
# LAC needs VC to translate its human capital potential into startups that improve lives

Latin America and the Caribbean (LAC) currently host 523,000 STEM researchers, not including technicians. This number is roughly one-fourth that of Europe or the USA when compared on a per capita basis. To increase this count, it is vital to enhance value creation and compensation within the existing talent pool.

The majority of these researchers are based in universities and government agencies, primarily focusing on academic publishing. They produce around 180,000 papers annually, averaging one paper per researcher every five years, a figure comparable to leading countries. However, the region significantly lags in patent production, with about 12,000 patents filed each year. This is around 20-40 times fewer patents per researcher than in countries like China and Israel.

Startup activity is also minimal. The lack of private sector R&D and early-stage venture capital for Deep Tech is the primary obstacle to developing a thriving regional ecosystem. LAC's per researcher Deep Tech venture capital investment is 13 times less than China's, 70 times less than that of the USA, and hundreds of times less than Israel's.

## Translating human capital into innovative startups that improve lives



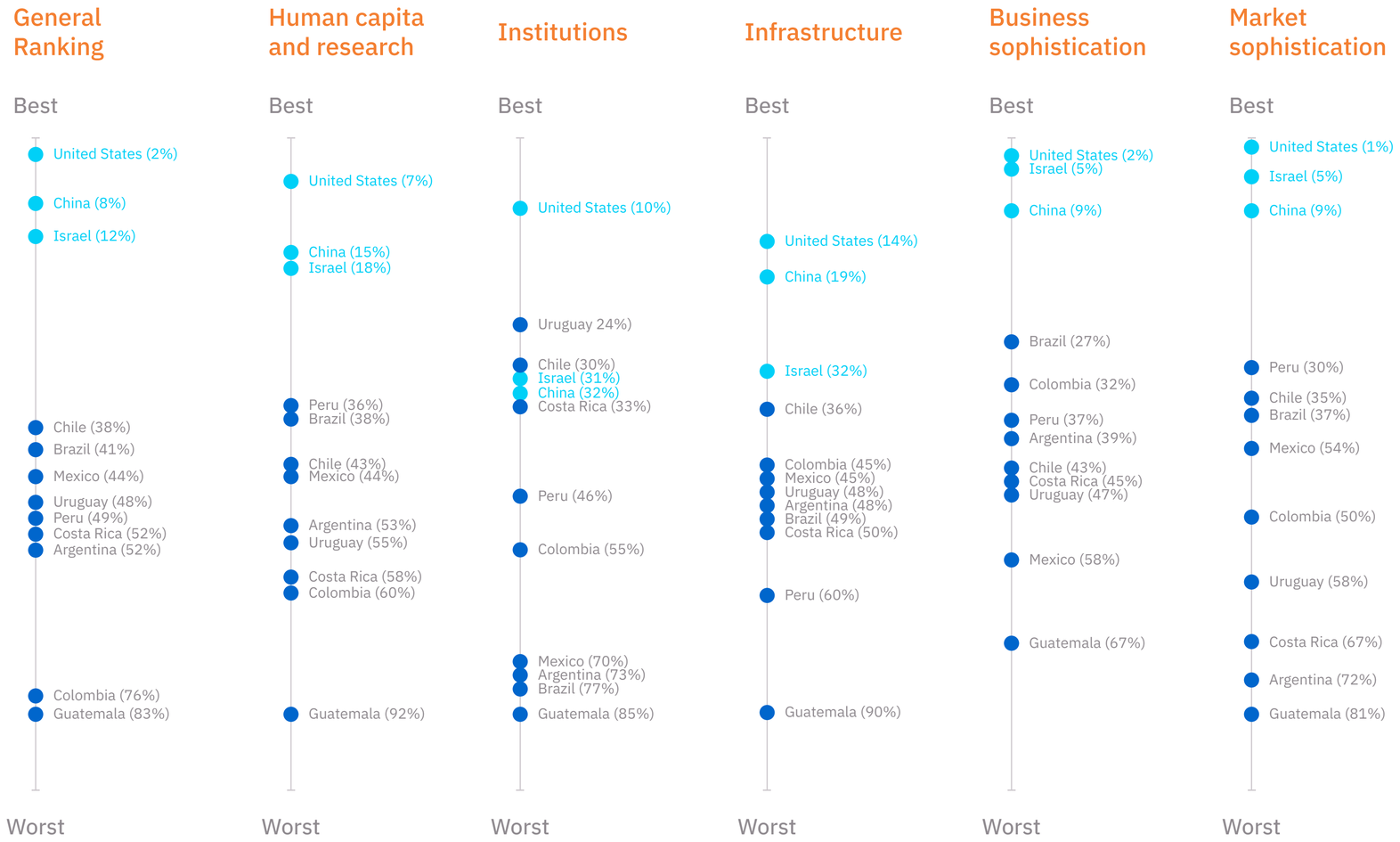

*Sources: WIPO, CEIC, RICYT, LAVCA, OSD, National Science Foundation, Surfing Tsunamis analysis*

# LAC innovation context lags behind innovation-driven countries

Realizing the full transformative potential of the Deep Tech ecosystem necessitates the establishment of a supportive economic and institutional context. The Global Innovation Index, developed by the World Intellectual Property Organization, identifies five key components that underpin an innovation-friendly environment: robust institutions, a well-educated and skilled workforce (human capital), modern infrastructure, market sophistication, and business sophistication.

In comparing the innovation inputs of LAC countries with those of established innovation-driven economies, it's clear that the LAC region faces significant hurdles in these areas. Innovation powerhouses like the USA, China and Israel have demonstrated the importance of well-functioning institutions, state-of-the-art infrastructure, and a market environment conducive to business growth and development. They have actively pursued policies and strategies to enhance these factors, resulting in them achieving higher rankings than LAC countries across all these dimensions.

## Innovation context (inputs) ranking of LAC and innovation-driven countries




*Sources: Global Innovation Index 2022, Surfing Tsunamis analysis*

# An innovation-friendly context is critical for sustainable and inclusive developemnt

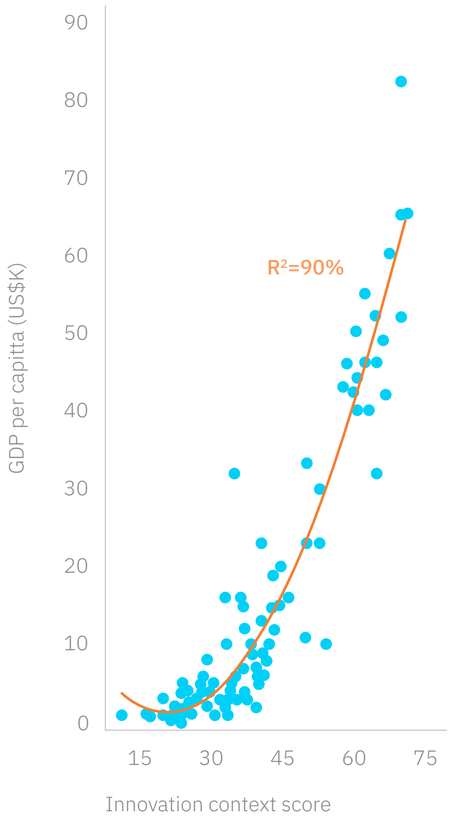
Enhancing a country's innovation context is not merely beneficial for Deep Tech startups; it's crucial for sustainable and inclusive development. Our analysis reveals a strong correlation between the quality of a country's innovation environment and its prosperity, poverty reduction, and environmental stewardship.

Using the Global Innovation Index's overall 'Innovation Inputs' score as a proxy for innovation context, we found robust correlations with GDP per capita, poverty levels, and environmental protection indices in various countries.

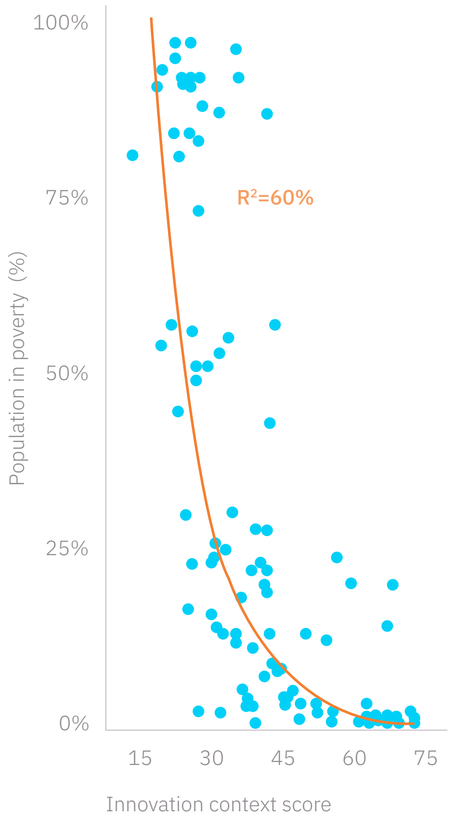
Establishing an environment conducive to innovation presents a significant challenge. However, the evidence demonstrates that it is a vital catalyst for a society's economic, social, and environmental advancement.

## Innovation context as a driver of sustainable and inclusive development

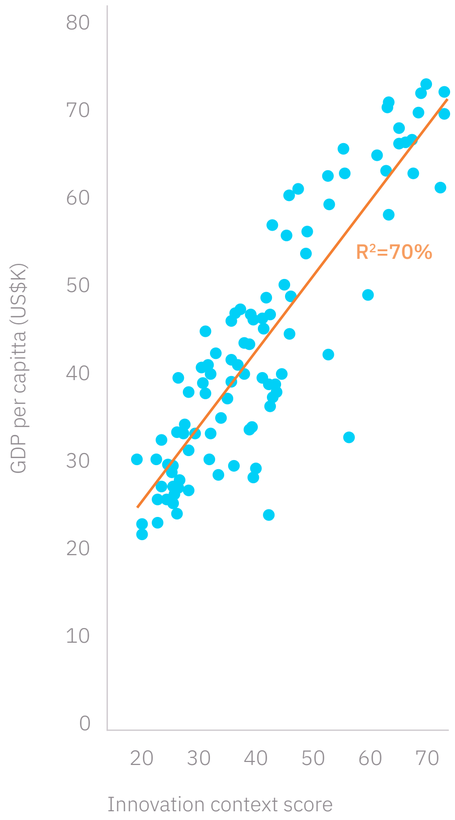
GDP per capita vs. innovation context score




Poverty vs. innovation context score




Environmental protection vs. innovation context score




*Note: We only included countries with more than 3M population*

*Sources: GII Report 2020, World Bank, Surfing Tsunamis analysis*

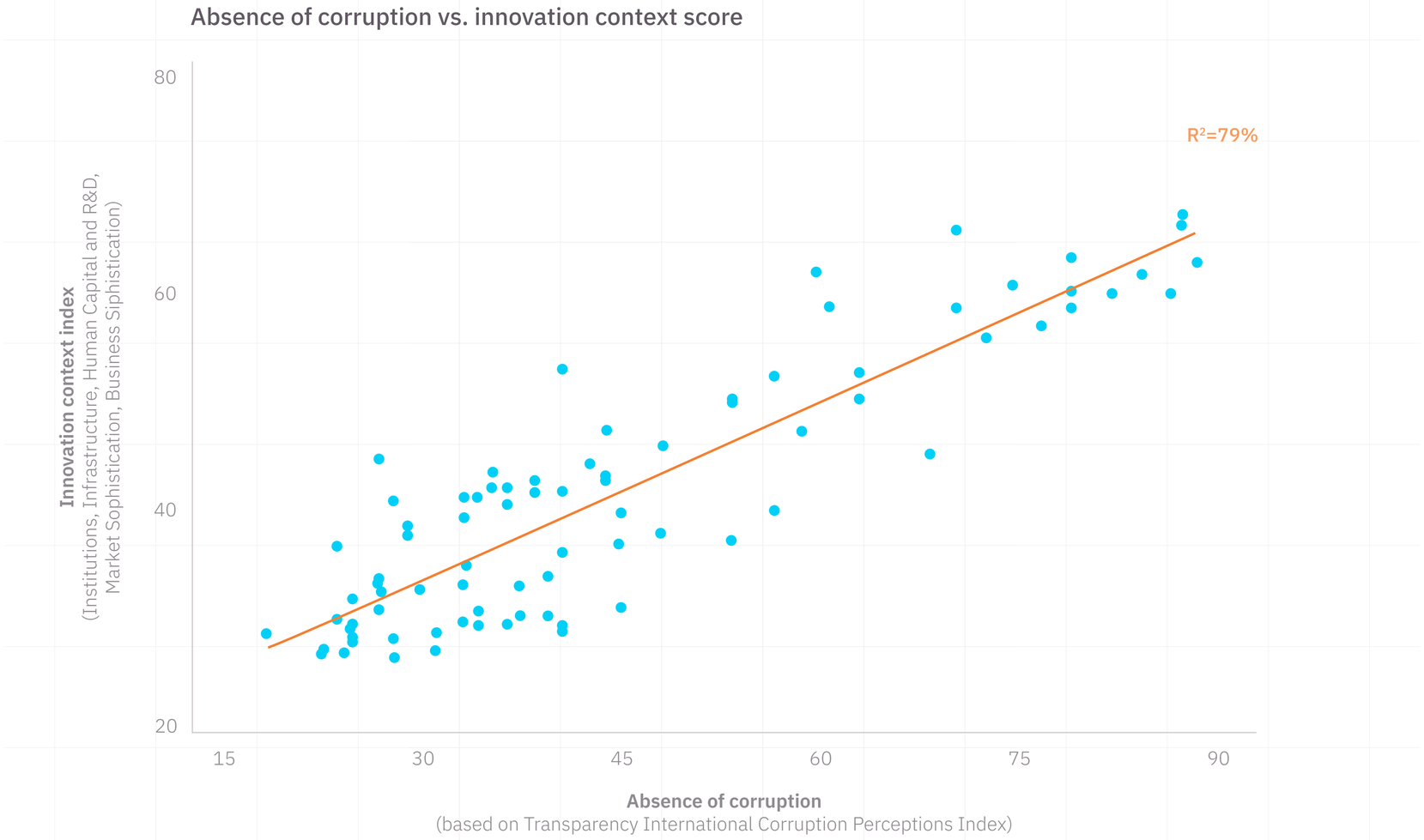
# Tackling corruption is critical for better innovation context

On previous page, we established that a country's prosperity, lack of poverty, and environmental sustainability are directly linked to its innovation context.

Now, we show that the quality of a country's innovation context is strongly influenced by the absence of corruption, as measured by the Transparency International Corruption Perceptions Index. Essentially, countries with lower levels of corruption tend to have stronger institutions, superior human capital, better infrastructure, and more sophisticated markets. This results in better innovation contexts and a more prosperous, inclusive, and environmentally friendly economy.

Although devising strategies to combat corruption falls outside the scope of this report, it's important to recognize this as a structural challenge.

## Absence of corruption as a determinant of innovation context




*Sources: Global Innovation Index, Transparency International, Surfing Tsunamis analysis*

# An integrated approach is needed to unlock Deep Tech potential

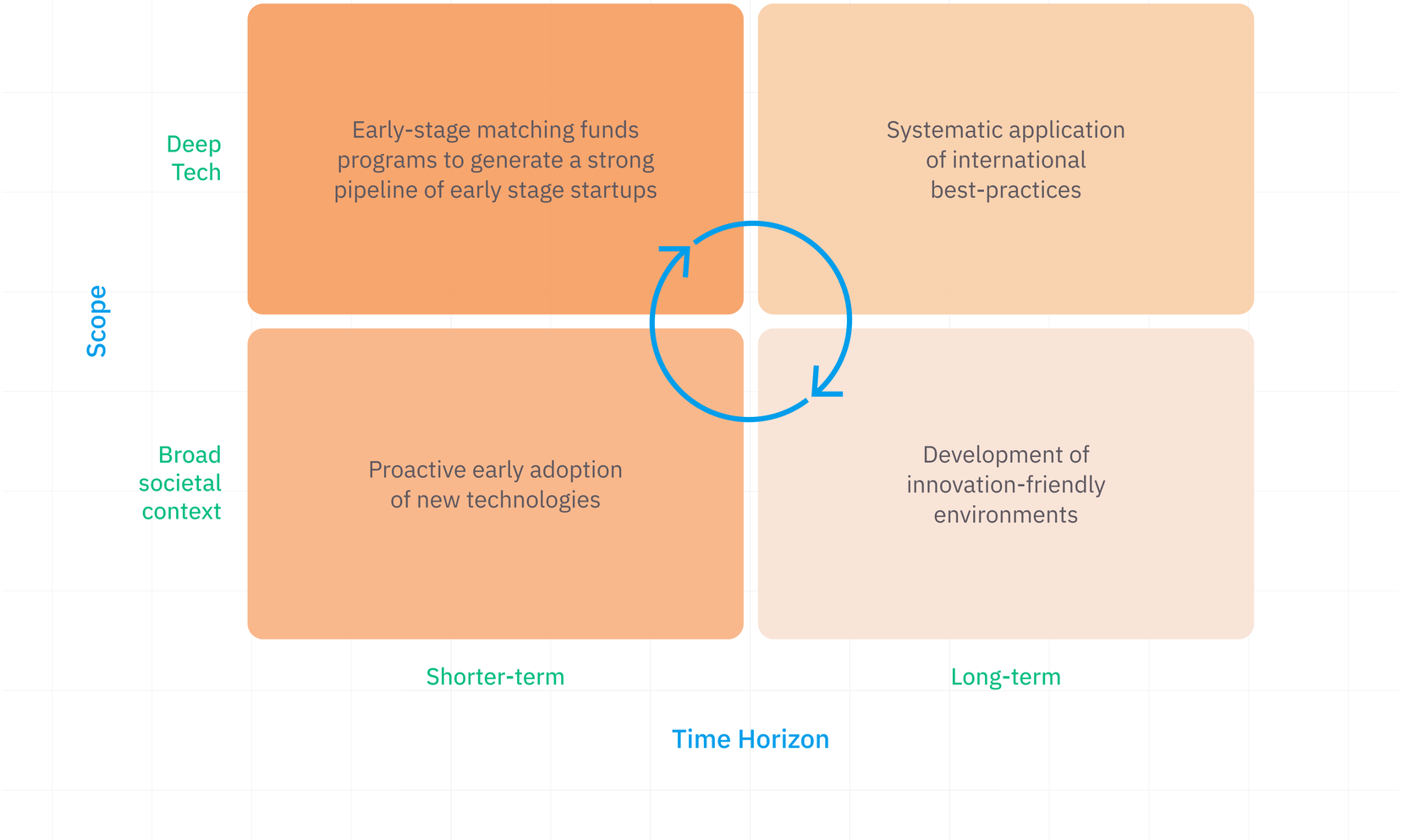
To unlock the full potential of the Deep Tech revolution, LAC must adopt an integrated approach that tackles both short-term and long-term challenges, and addresses broader societal and Deep Tech ecosystem issues, ultimately creating a virtuous cycle of transformation. The most immediate ways to achieve impact are to accelerate the adoption of new technologies and to establish matching fund programs that generate a robust pipeline of early-stage startups.

To achieve even greater success, the region can leverage best practices for developing Deep Tech ecosystems. For this purpose, we have developed a playbook highlighting key initiatives, based on international and regional experiences, which we present below.

Finally, the region must work towards improving its institutional environment, by addressing corruption, which is essential for good policymaking, and focusing on the broader pillars of institutions, infrastructure, and market environment.

In the remaining part of this chapter, we delve into most of these levers in more detail.

**Main challenges to unlock the full potential of Deep Tech in LAC**



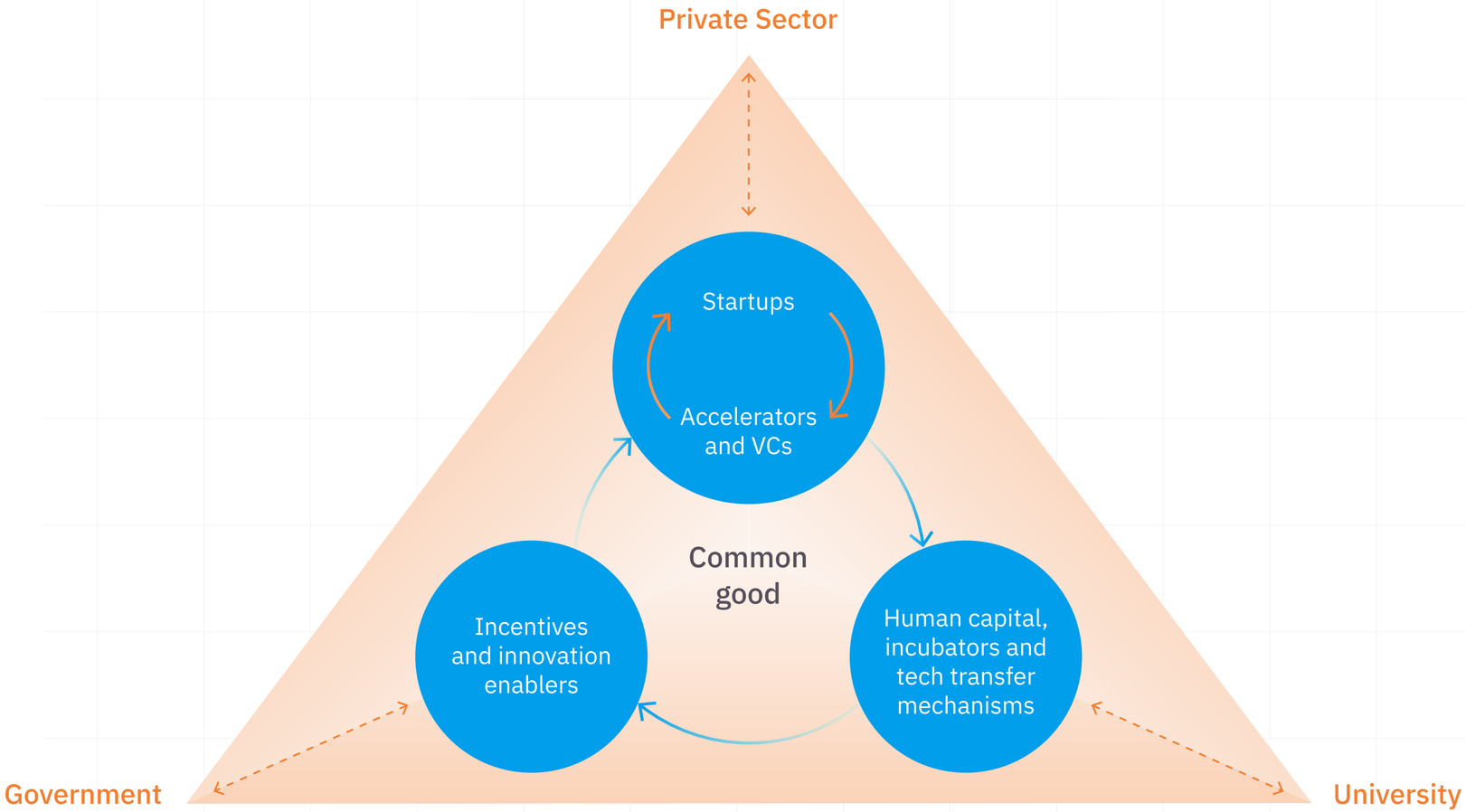

*Sources: GridX, RICYT, Surfing Tsunamis analysis*

# A new model of Deep Tech innovation can make the triple helix work in LAC

In 1968, Jorge Sabato and Natalio Botana posited that scientific and technological innovation would be indispensable for Latin America and the Caribbean's (LAC) progress. They proposed a model, based on an idea by Galbraith, that emphasized the importance of collaboration among the government, productive structures, and the technological-scientific infrastructure. This concept later evolved into the 'triple helix' model, which brings together the government, the private sector, and universities.

What we've learned from the emerging Deep Tech ecosystem is that a new set of components is required for Sabato's triangle to function effectively. The core of this new model consists of startups and investors, which can generate a virtuous cycle of successful ventures and human capital accumulation. The public sector can enhance this cycle by providing incentives, such as matching funds, and by establishing innovation enablers like technology districts and free zones. Universities, in turn, can play a pivotal role by supplying human capital, forming incubators, and developing efficient tech transfer mechanisms.

**A new model is needed to make the triple helix work towards common good**




*Source: Surfing Tsunamis analysis*

# LAC can deploy a powerful playbook to boost Deep Tech

Governments, corporations, family offices, and universities can all contribute to the development of Deep Tech startup ecosystems in the LAC region.

On this page, we present an overview of proven strategies for participating in the Deep Tech revolution. The most crucial factor in the short term is the creation of reimbursable matching fund programs. These programs have proven to be more effective, less bureaucratic, and more sustainable than traditional grants typically used in the region.

All participating entities stand to gain from contributing to the development of this ecosystem. The public sector can stimulate investments, create employment opportunities, boost exports, and increase tax revenue. Corporations and family offices can invest and earn attractive returns while enhancing their capacity to navigate a future of disruption. Universities can increase their R&D budgets, elevate their institutional standing, and attract top talent.

## High level view of Deep Tech playbook

| | Play | LAC case | Global case |
|---|---|---|---|
| Public sector | Matching funds for:<br>- Accelerators<br>- Early stage venture capital<br>- Private sector R&D<br>- Shared labs<br>- Applied R&D academic programs<br>Technology districts and parks<br>Free trade zones<br>STEM education<br>Tax incentives for private sector R&D<br>Technology transfer laws<br>City/state level economic development corporations<br>Ecosystem connectivity through events<br>Grants for international graduate programs<br>Technology development challenges<br>Resource-backed technology sector strategies | Chile & Argentina<br>Chile & Argentina<br>Chile<br>Argentina<br>—<br>BA Innovation Park<br>Uruguay & Costa Rica<br>Costa Rica<br>—<br>—<br>Brazil<br>Chile<br>Brazil<br>—<br>Chile (Clean Energy) | Israel<br>Israel<br>Israel<br>Boston & New York<br>New York<br>Beersheva & Barcelona<br>China & Ireland<br>Korea<br>Singapore & Korea<br>USA & Israel<br>New York<br>Miami & Saudi Arabia<br>China & Saudi Arabia<br>USA (DARPA)<br>USA (Biotech) |
| Corporations & family offices | Corporate venture capital units<br>Acquisition of startups<br>Family office investments in Deep Tech<br>Collaboration with startups<br>Collaboration with universities tech transfer units | Bioceres & Gerdau Next<br>Pharma companies<br>Several<br>Gerdau (Ubiratã)<br>Pharma companies | OpenAI & Tyson Foods<br>Intel, Pfizer, Google & Meta<br>Bill Gates<br>Microsoft & Pharma<br>Novartis, Merck & Google |
| Universities | Joint STEM/business student programs<br>Accelerator and incubator units<br>Technology transfer companies<br>Student and faculty exposure to entrepreneurs<br>Entrepreneurship topics on curricula<br>In depth study of international best practices<br>University technology parks<br>Startup creation challenges | —<br>Universidad Litoral<br>Universidad Litoral<br>Tecnológico Monterrey<br>Católica de Chile<br>—<br>Tecnológico Monterrey<br>IB50K/110K Latam | Stanford<br>MIT Engine<br>Yissum (Israel)<br>Stanford<br>Stanford/Technion<br>Korea<br>Stanford Research Park<br>MIT Solve |

*Source: Surfing Tsunamis analysis*

# Matching funds for accelerators and early-stage VCs can trigger a virtuous cycle

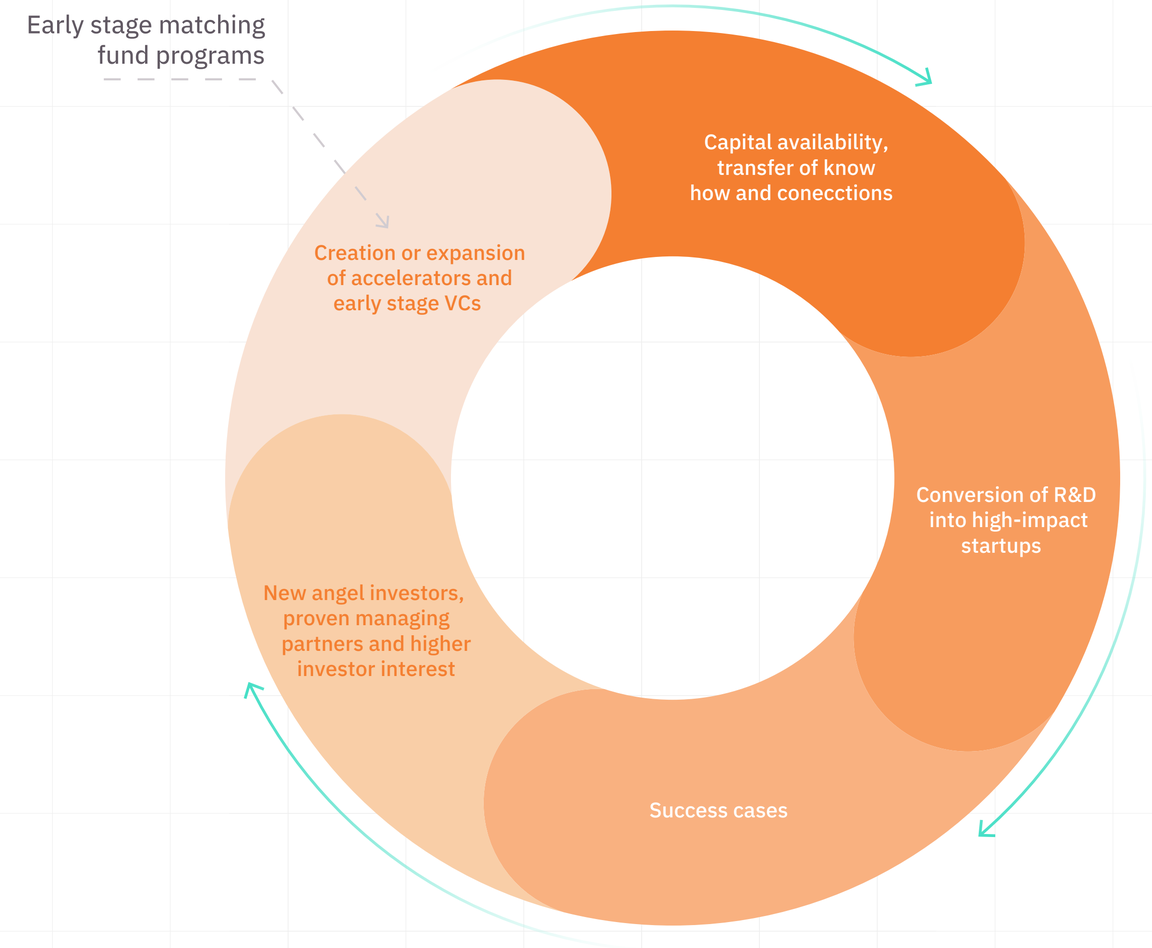
Reimbursable matching fund programs played a catalytic role in the development of successful Deep Tech ecosystems, as exemplified by Israel.

Supporting early-stage incubation or accelerator programs with matching funds fosters capital availability and assists startups in initial prototype development. Additionally, it provides startups with valuable technical and business development expertise, along with connections to suppliers and global networks. This support aids them in transforming their R&D efforts into high-impact startups, preparing them to approach later-stage investors. These investors offer larger investments and help the companies to expand globally.

Over time, the establishment of robust early-stage pipelines eventually leads to successful startups. This enables investors to secure additional capital. Also, entrepreneurs who find success frequently transition into roles as angel investors, while other new investors develop an increased interest in the emerging verticals. This interest boosts investment activity and generates a virtuous cycle that requires minimal public intervention once the cycle is in motion.

Since the public sector can recoup funds used for the program, it facilitates a virtuous economic cycle with minimal capital deployment.

## Virtuous cycle ignited by early stage matching fund programs




*Source: Surfing Tsunamis analysis*

# Israel highlights the transformative potential of Deep Tech

In the mid-1980s, Israel found itself in a severe crisis. The country's GDP per capita was $6,300, and it grappled with unsustainable debt levels at 176% of GDP. Inflation was spiraling at over 300% per year. To compound the issue, an oversized public sector, accounting for over 70% of GDP, placed a heavy burden on the economy.

Despite these odds, Israel orchestrated an impressive turnaround. By 2010, the country's GDP per capita had soared 4.5 times, and debt levels were trimmed to a more manageable 79% of GDP. Inflation was reined in to a modest 3%, and the public sector was reduced to 45% of GDP. The key to this extraordinary transformation was a three-pronged approach that involved stabilization, modernization, and a focus on innovation as a primary economic engine.

Thanks to government programs based on matching funds, accumulated venture capital investments surged from a negligible amount in 1990 to almost $15 billion in 2010. Startup activity expanded 11-fold, NASDAQ-listed companies grew 6.5-fold, and high-tech exports surged 4.5-fold. Today, Israel is known as the 'Startup Nation.

## Israel case: Evolution of main economic and ecosystem indicators


*Sources: Israeli government, multiple research papers, Surfing Tsunamis analysis*

# Matching fund programs were key for the Startup Nation

Israel is renowned globally as the Startup Nation, but many are unaware that the key principles and policies responsible for its success can be replicated in our region.

The cornerstone of Israel's public policies lies in addressing the well-known market imperfection of private underinvestment in innovation by adjusting market risk-return profiles through matching funds. The government implemented a series of policies where it co-invested in projects validated by private sector resources. In case of a successful project, the private partner must return the investment along with an interest rate. In case of failure, both sides suffer losses. Such schemes align incentives, leading to minimal bureaucracy and greater agility in comparison to the simpler grants that are more prevalent in LAC. Reimbursements result in greater fairness and sustainability.

Three matching-funds programs set the ecosystem in motion. The first is the R&D Law of 1985, which offered matching funds for R&D projects, attracting over 100 international R&D centers, and elevating private sector R&D. The second was the incubator program of 1991 that created matching funds for technology incubators, setting in place a strong pipeline of Deep Tech startups. The third was the Yozma Program, which sparked the VC industry with ten funds.

## Israel case: key public policies for take-off

| | R&D Law (1985) | Incubator Program (1991) | Yozma Program (1993) |
|---|---|---|---|
| Focus | 1,000 R&D projects (each year) | 24 incubators | 10 VC funds |
| Investment | US$300M/year (20-50% R&D) | US$600M (1991-2012) (85% R&D plan) | US$100M (% recouped) (40% public-60% private) |
| Key Concept | Matching funds (reimbursable) | Matching funds (reimbursable) | Matching funds (reimbursable) |
| Impact | ~4% GDP<br>>US$2B exports/year<br>>1K patents/year<br>>50K researchers | >1,700 startups<br>40% survival rate<br>US$3.5B private investment | 70 VCs c/US$10B AuM<br>>US$80B value creation<br>56% Yozma exits |

*Sources: Multiple academic studies, Surfing Tsunamis analysis*

# Matching funds put in motion the Israeli startup ecosystem

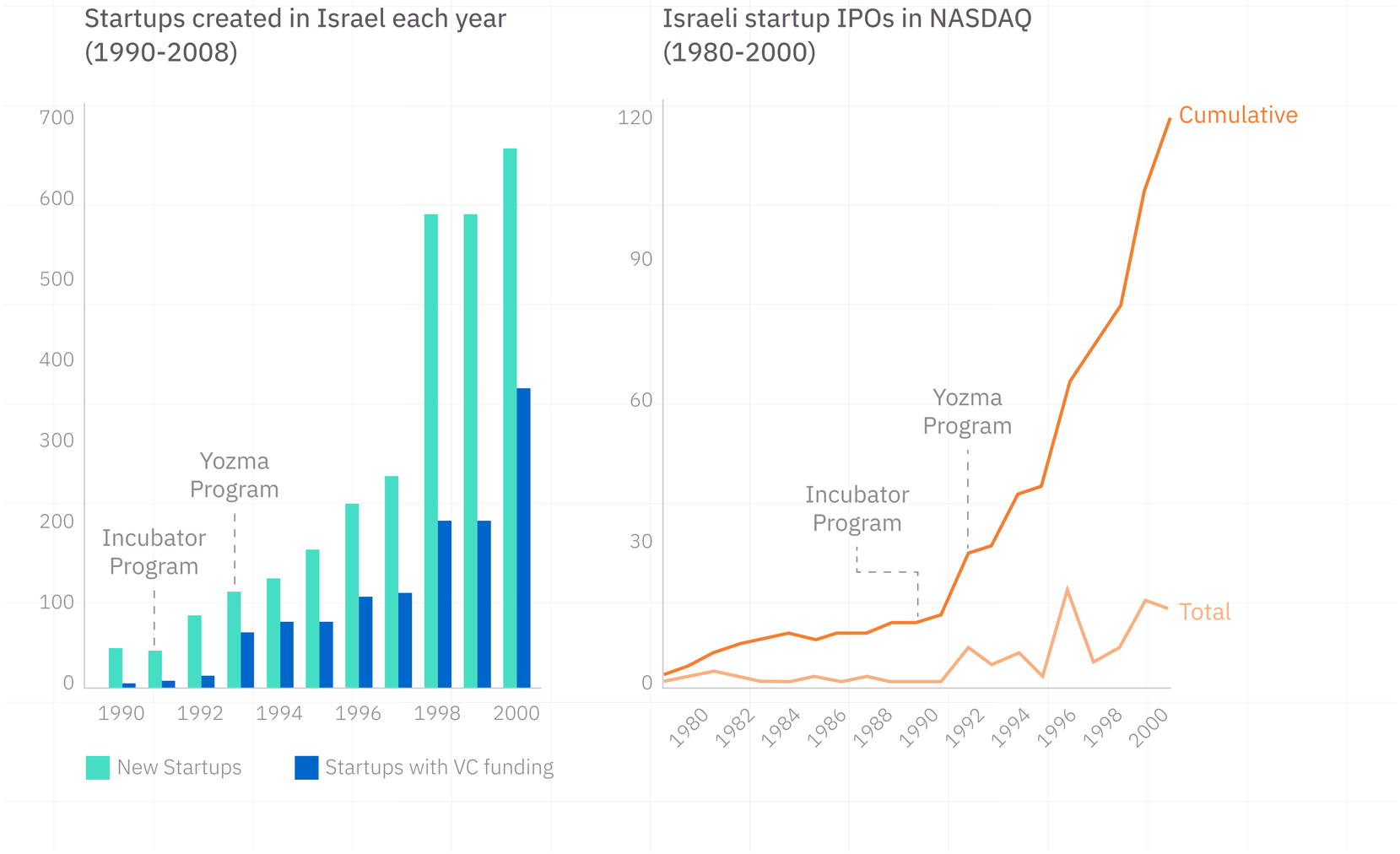
As we can see in these graphs, Israel's startup boom was spurred by the Incubator and Yozma Programs, which sparked a tenfold increase in startup formation and the number of startups listed on NASDAQ.

The process originated in 1990, when Israel received a massive influx of almost one million highly educated immigrants from the former Soviet Union. With a population of only five million at the time, managing this wave was no easy feat. In response, the government established a technology-based startup incubator program to support these immigrants, with 24 privately-led incubators offering to match both operational expenses and investments in early-stage startups.

The program was successful in generating startups with promising products, but it soon became clear that they lacked the necessary skills and connections to thrive on a global scale. The small Israeli market was insufficient, and companies did not have the capital or know-how to expand globally.

To address this challenge, the Israeli government created the Yozma Program, a second matching fund program backed by $100M. The focus of this program was on joint ventures between local investors and global venture capitalists, recognizing the critical role that VCs play in the development of global startups.

## Impact of Israel matching funds programs on startup creation




*Sources: The Atlantic, Gil Avnimelech, Surfing Tsunamis analysis*

# Matching funds for accelerators and early-stage VCs can trigger a virtuous cycle

Israel's matching funds policies have been emulated by several countries, including New Zealand. These policies were also highlighted as the most successful in the world by Josh Lerner, a professor who leads venture capital research at Harvard University in his book *"Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed--and What to Do about It"*, published by the Kaufman Foundation.

Building on the success of Israel's policies, Argentina pushed forward an Entrepreneurs Law in 2017 that simplified the creation of startups and established a Fund of Funds called FONDCE. This fund instituted reimbursable matching funds for science-based accelerators and VCs, playing a catalytic role in the creation of 5 Deep Tech accelerators and funds that invested in 79% of Argentina's investor-backed Deep Tech accelerators. These developments explain why Argentina has an outsized number of startups.

Chile is another country that successfully employed this method through CORFO, which has deployed numerous matching fund initiatives to promote the local ecosystem.

Other LAC countries should examine matching funds from around the world and adopt the most relevant elements to their markets.

## Example: Matching funds played an important role in Argentina

**Entrepeneurs laws of Argentina (2017)**

**Found of Funds (FONDCE)**

Inspired by Israel Incubator and Yozma Programs

**Matching funds for VCs**

Reimbursable and interest bearing loans for investments and partial grants for operating expenses

**Matching funds for science-based accelerators**

Reimbursable and interest bearing loans for investments and partial grants for operating expenses

**Simplified company creation**

Regime that enabled the creation of a startup in less than 24 hours

**5**

Funds and Deep Tech accelerators that invested in

**79%**

of Argentina's investor-backed Deep Tech startups

*Sources: Kaufman Foundation, CORFO, FONDCE, Infobae, Surfing Tsunamis analysis*

# The industries of the future require a new layer of infrastructure

To fully harness the Deep Tech revolution, LAC requires a fresh layer of infrastructure. While traditional elements like roads and ports retain their importance, this new layer will be indispensable for the economy of the future.

The adoption of solar and wind power requires bolstering electric power grids and investing in energy storage capacity. Shared biotech labs and other R&D infrastructure can foster growth in the biotech sector, while accelerators and incubators can incubate a significant number of deep tech startups. Innovation districts, tech parks, and free zones could further nurture innovative communities and cluster creation.

For citizens to reap the benefits of affordable and sustainable transportation, the establishment of extensive networks of EV charging stations will be required. Promoting a stronger and more secure digital infrastructure will reduce the cost of internet connectivity, helping to bridge the digital divide. Enhancing educational infrastructure, comprising schools, universities, and research laboratories, is vital for enlarging the talent pool and significantly increasing university graduation rates.

As LAC adapts to deep tech, developing flexible regulatory frameworks that provide clear guidelines, uphold standards, and promote innovation becomes necessary. Upgrading and expanding healthcare infrastructure, leveraging telemedicine, and integrating distributed solutions are also critical. Likewise, electrifying the public transportation infrastructure is key.

These changes are not just beneficial, they are essential for LAC to fully harness the opportunities presented by the Deep Tech revolution, so we will explore them further in the following pages.

*Source: Surfing Tsunamis analysis*

## Examples of infrastructure for the industries of the future

Accelerators & incubators


R&D infrastructure (such as shared labs)

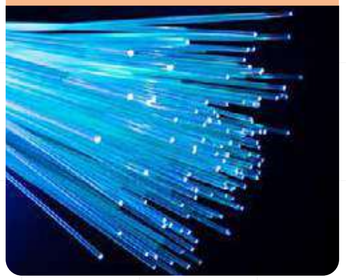
Innovation districts

Free zones

Electric power grids & storage

Education infrastructure


Digital infrastructure



EV charging infrastructure

# Shared labs can boost early-stage startups

The concept of sharing labs has the potential to serve as a vital catalyst for biotech startups in LAC countries where resources are scarce but talent is abundant.

Biotech startups often encounter financial hurdles when trying to access the necessary laboratories and equipment for their research. Shared lab spaces offer a solution by making laboratory costs variable, enabling innovators to sidestep the need for large upfront investments.

However, while this model can generate significant positive externalities, it may not be highly profitable for the operators of the labs. This is where matching funds from the public sector could come into play to ensure the sustainability and expansion of such initiatives.

A prime example of this model's success is LabCentral in Cambridge, USA, which has provided support to 247 startups. These startups collectively raised $23B in capital and created 5,892 jobs. On a different scale, Loci Labs in Buenos Aires, Argentina, is working on developing a similar value proposition.

## Example: LabCentral

**Location**
Cambridge, USA

**Founded in**
2013

**Organization type**
Non-profit

**Funding**

- $10M of initial funding
  - 50% public, 50% NGOs and corporations
- Main source of revenue is office and equipment rental

**Size**

- Initial: 2,600 m2
- Today: 21,000 m2

**Impact**

- 247 startups benefitted
- 1k researchers on campus
- Startups raised $23B, were awarded 160 patents, started 166 clinical trials and created 5,892 new jobs

*Sources: LabCentral 2022 Impact report, Surfing Tsunamis analysis*

# Free zones can attract and retain hardware and biotech operations

Global biotech and hardware startups require seamless access to materials, equipment, and international suppliers and clients. However, many LAC countries have trade barriers that hinder their operations.

Free Zones are a powerful solution. These are small, fenced-in, duty-free areas where goods can be imported, manufactured, and re-exported under specific customs regulations. This model allows countries to create spaces that are highly integrated with the global economy, without the need to change their overall trade models.

This approach has proven successful around the world. Special Economic Zones in China, such as Shenzhen, and the Shannon Free Zone in Ireland, have promoted growth and innovation. In Latin America, Costa Rica has 41 Free Zones that played a key role in positioning the country as an exporter of electronics and medical devices. Uruguay's 11 Free Zones have attracted the operations of cutting-edge technology startups from abroad, such as Satellogic, to attractive locations such as Zonamerica and Parque de las Ciencias.

*Sources: Government of Uruguay, Asociación de las Zonas Francas de Costa Rica, Surfing Tsunamis analysis*

*Image: Wikipedia*

## Example: Uruguay Free Zone

**Number of Private Free Zones**
9

**Year foundation**
1990

**Most relevant examples**
- Zonamerica
- Parque de las Ciencias

**Benefits for companies**
- Ease of import-exports and no import-export duties, critical for biotech and hardware operations
- No national taxes
- No social security contributions for expats
- No restrictions for capital flows

**Impact (2020)**
**Companies:** 1,094
**Employees:** 16,578
**Average monthly salary:** $3,123
**Exports:** $4,549M (56% of total)

Satellogic and other international startups adopted Uruguay for their global manufacturing

# Innovations districts in central urban areas can boost innovation

During the second half of the last century, innovation was primarily concentrated in suburban areas like Silicon Valley. In recent decades, this model has been complemented by urban innovation districts.

According to the Brookings Institution, innovation districts are geographic areas where leading anchor institutions and companies cluster and connect with startups, business incubators, and accelerators. These districts are physically compact, transit-accessible, technically wired, and offer mixed-use housing, office, and retail spaces. They leverage existing assets and have proven to be a successful development model that could be replicated throughout Latin America and the Caribbean (LAC).

Some benchmark examples include the Buenos Aires Innovation Park in Argentina, the Boston Waterfront Innovation District, Kendall Square in Cambridge, USA, Cortex in St. Louis, USA, and 22@Barcelona in Spain.

## Example: Buenos Aires Innovation Park

*Image: Gobierno de la Ciudad de Buenos Aires*

### What
A central, dense location focused explicitly on innovation

### Location
Buenos Aires, Argentina

### Status
Under development

### Size
- 12 city blocks
- 340,000 m2 building permit
- 164,000 m2 of innovation area

### Building blocks
- Universities
- Research centers
- Co-working spaces
- Startups, corporations, VCs
- Restaurants and coffee shops
- Green areas

### R&D and universities
- 2,000 teachers and researchers
- 4 universities focused on STEM
- 18,000 students visiting daily
- 80,000 students nearby

*Sources: The Brookings Institution, La Nación, Cortex, Perfil, Buenos Aires Government, Arthur D. Little, Forbes Argentina, Surfing Tsunamis analysis*

# University accelerators can boost innovation and funding

LAC universities are recognizing the need for technology transfer to convert university research into practical innovations. Yet, these structures alone aren't enough for a robust startup ecosystem that brings significant benefits to society and universities.

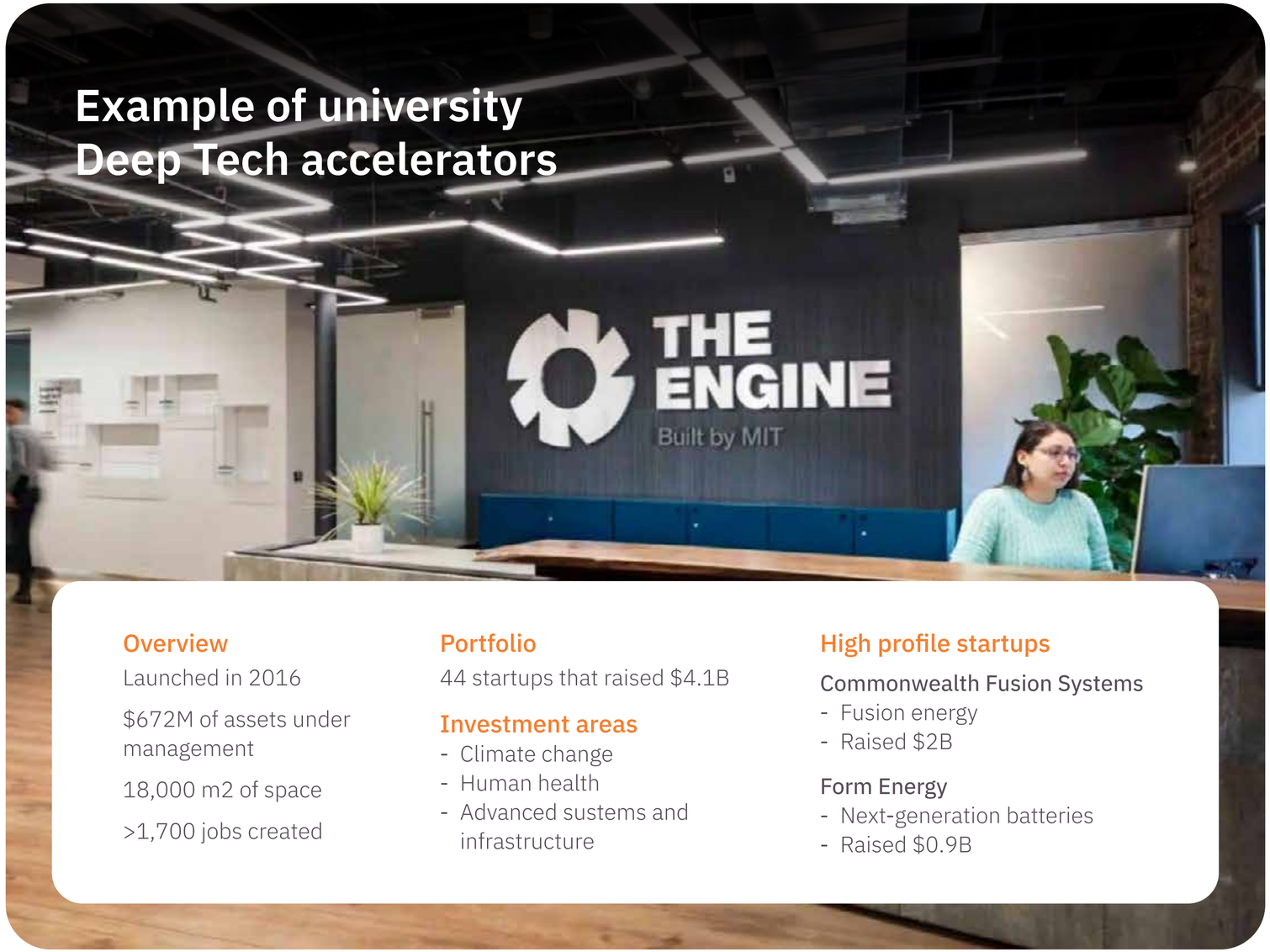
Universities leading Deep Tech innovation such as MIT, Stanford, Oxford and The Hebrew University of Jerusalem have gone a step beyond and created university accelerators. University accelerators are unique programs affiliated with universities that aim to fast-track the growth of start-ups, often through a combination of mentorship, resources, and funding. They serve as vital incubators of innovation, connecting bright ideas with the necessary capital, mentorship, and entrepreneurial acumen to transform them into viable, market-ready solutions.

University accelerators can play a key role in cultivating an entrepreneurial culture within academia. They encourage students and faculty to apply their knowledge and skills outside the confines of traditional career paths and consider entrepreneurship as a viable option. Moreover, these accelerators can have a substantial economic impact, both for universities and local communities.

A prime example is MIT's The Engine Accelerator. This program supports 'tough tech' startups that are addressing the world's most urgent problems but often require extensive time and funding to commercialize. The Engine provides long-term capital, affordable workspaces, and access to specialized equipment and a network of experts.

As mentioned above, the LAC region already features university incubators and accelerator. The challenge is to boost their capabilities (teams, governance, capital, labs, office space, international networks, know how) to translate university R&D into startups that make the world a better place.

*Sources: MIT Technology Review, The Engine, Surfing Tsunamis analysis*




## Example of university Deep Tech accelerators

### Overview

Launched in 2016

$672M of assets under management

18,000 m2 of space

>1,700 jobs created

### Portfolio

44 startups that raised $4.1B

### Investment areas

- Climate change
- Human health
- Advanced sustems and infrastructure

### High profile startups

**Commonwealth Fusion Systems**
- Fusion energy
- Raised $2B

**Form Energy**
- Next-generation batteries
- Raised $0.9B

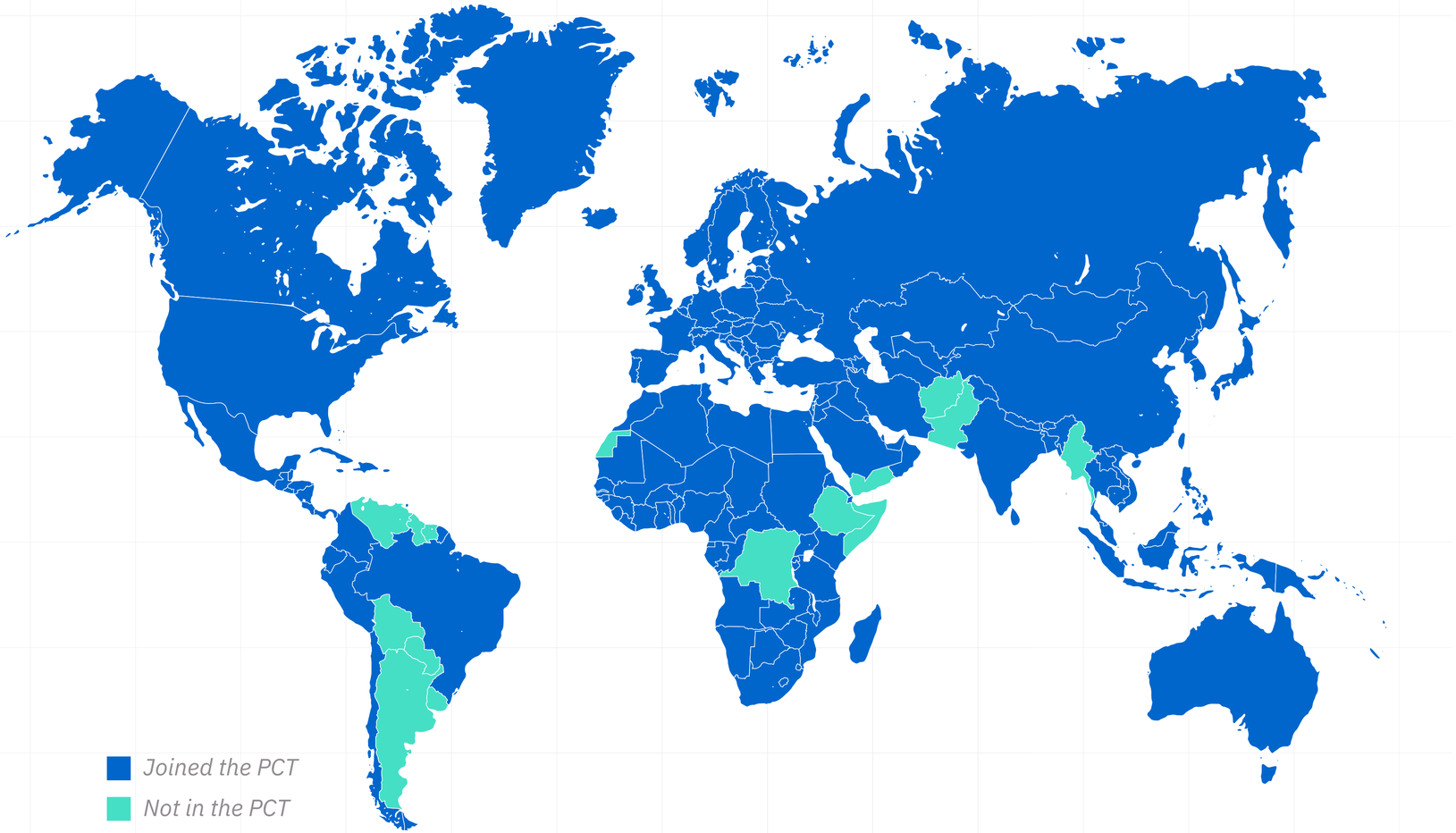
# Some LAC countries could ease innovation by joining the PCT

The Patent Cooperation Treaty (PCT), established in 1970 by the World Intellectual Property Organization, enables applicants to protect their patents globally by filing a single international patent application.

This system is especially valuable for cash-strapped early-stage startups, as it allows them to protect their inventions in a large number of countries simultaneously.

Currently, 157 countries have signed the treaty, but unfortunately, some countries in Latin America and the Caribbean have yet to join. This makes it more challenging for inventors in those countries to safeguard their intellectual property and generate service exports for their local economies.

**Countries that are contracting states in the patent cooperation treaty**




*Sources: WIPO, Surfing Tsunamis analysis*

# Dedicated quasi public development and innovation institutions can be game changers

Quasi public development organizations are ideal to design and promote long-term innovation policies combining a focus on common good with private sector agility and relative isolation from election cycles.

A prime examples is The New York City Economic Development Council (NYCEDC), a public-private non-profit that uses public resources to stimulate the city's economic growth. Established in response to the 2009 financial crisis, the NYCEDC employs a team of highly skilled professionals from elite institutions and offers competitive compensation and agility due to its dedicated budget. Its board of directors facilitates public-private cooperation. The organization has implemented numerous initiatives to foster innovation, using methods such as competitive bids, matching funds, and tax breaks. This has been instrumental in transforming New York City into a leading global startup ecosystem, with venture capital investments growing from $2.1B in 2009 to $55.5B in 2021.

Other notable organizations of this kind include the Massachusetts Life Sciences Center, RutaN in Colombia and FAPESP in Brazil.

## Example: New York City Economic Development Council (NYCEDC)

**Applied Sciences NYC**

Over the next three decades, the Applied Sciences NY project in Roosevelt Island is expected to double engineering faculty and students while creating $33B of overall impact, 48,000 jobs and 1,000 new startups.

**LifeSci NYC**

LifeSci NYC is a $1B initiative to transform New York into a world leader in life sciences. The initiative involves $430M to spur new research, $20M to build a diverse talent pipeline and $530M for 1M m2 of lab and incubator space construction.


**Alexandria Center for Life Sciences**

The Alexandria Center for Life Sciences is a state of the art research and development campus (50% developed, 50 tenants to date) that will provide 120,000 m2 of labs, office space and amenities for life science startups and corporations.

**Center of Urban Manufacturing**

The Brooklyn Navy Yard was transformed into a center of urban manufacturing and innovation. It's located across 300-acres and hosts over 500 companies (including high tech) than employ 11,000 people and generate $2.5B in economic impact.

*Sources: Crain's New York, NYC Council, Alexandria Launch Labs, Surfing Tsunamis analysis*

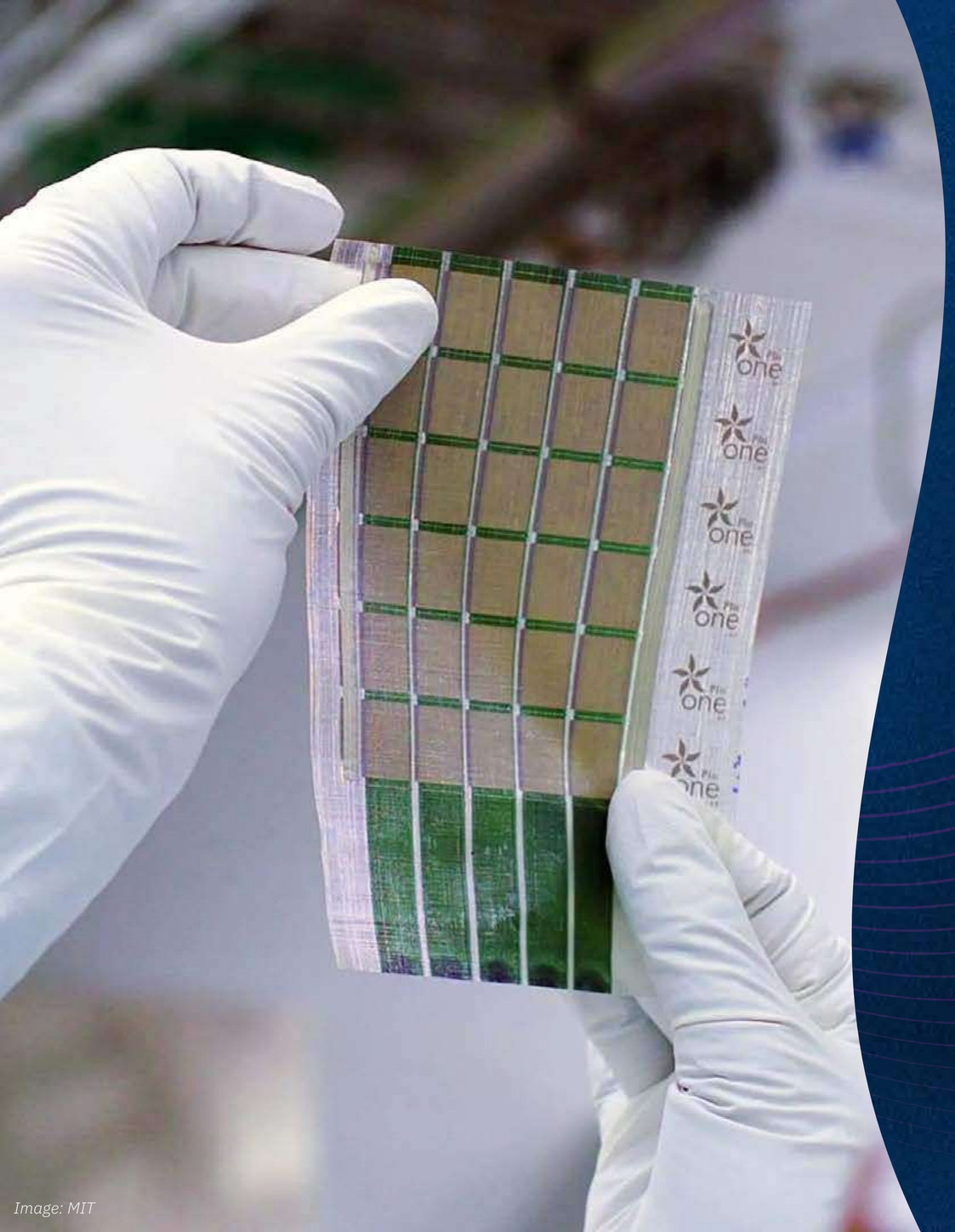


*Image: MIT*

**Appendix**

# COUNTRY PROFILES

# Argentina Deep Tech ecosystem overview

Argentina has the highest number of Deep Tech startups in LAC (103 startups, 30% of the total, mostly early stage). Argentina was the birthplace of Auth0, a cybersecurity company that was sold in 2021 to OKTA for $6.5B and reached the highest valuation to date for a Deep Tech startup from the region. Currently, local Deep Tech startups are worth $1.9B, representing 23% of the regional ecosystem value.

The biotech sector is the leading sector, representing 67% of local Deep Tech startups, but there is also a significant emerging Spacetech sector, led by Satellogic.

Argentina also has the highest number (6) of Deep Tech-specific funds, all focused on early-stage startups. GridX and CITES played a key role in the biotech ecosystem and are now joined by SF500, a new biotech fund with support from Bioceres and the Santa Fe province. The Draper Cygnus and Air Capital teams invest in startups from multiple fields, like Auth0 and Satellogic. While not strictly focused on Deep Tech, Dragones Venture Partners, Oikos, and over 40 generalist funds have invested in Deep Tech startups. Aceleradora del Litoral is a regional pioneer in university accelerators.

The Entrepreneurship Law of 2017 and its matching funds program have significantly impacted the ecosystem, supporting funds and accelerators that invested in 79% of local Deep Tech startups.

## Argentina highlights

**103**
Startups received VC funding

**$1.8B**
Ecosystem value

**6**
Top Deep Tech funds based in Argentina

**30%**
% of Deep Tech LAC startups

**23%**
% of Deep Tech LAC ecosystem value

**>40**
Generalist funds investing in Deep Tech in Argentina

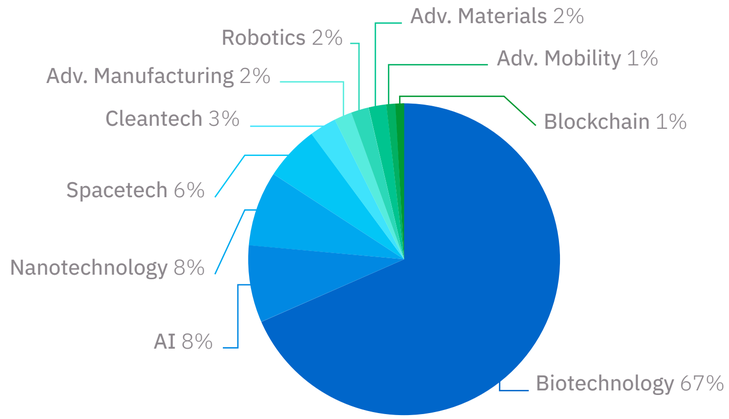
## Top Deep Tech startups based in Argentina

| Company | Sector | Valuation range | City |
|---|---|---|---|
| Bioceres | Biotech | $0.5-1B | Santa Fe |
| Statellogic | Spacetech | $100-500M | Buenos Aires |
| Moolec | Biotech | $100-500M | Buenos Aires |
| Stämm | Biotech | $100-500M | Buenos Aires |
| Eternal Mycofood | Biotech | $50-100M | Buenos Aires |

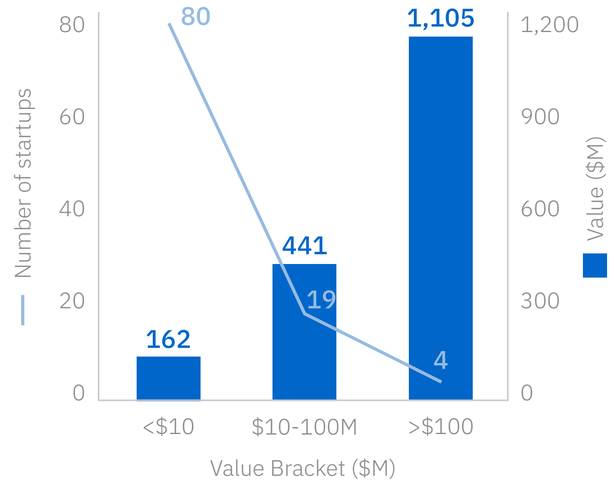
## Top Deep Tech funds investing in Argentina

GRIDX · air capital · cites · Draper Cygnus · LITORAL · SF500

## Leading sectors by number of Deep Tech startups




## Number and value of startups per valuation range




*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis*

# Brazil Deep Tech ecosystem overview

Brazil ranks second in startup activity, boasting 101 startups. These comprise 30% of the region's total, nearly matching Argentina, and contribute to an ecosystem value of $1.9B (23% of the total). Despite fewer startups than expected, Brazil's Deep Tech ecosystem boasts a significant pool of valuable startups. Notably, 37 companies are valued at over $10M, underscoring their considerable potential and success.

Biotech leads with the highest number of startups, accounting for 57% of the total, including the two most valuable startups.

Deep Tech companies, though predominantly based in São Paulo, also have a significant presence in cities like Florianopolis, Curitiba, and Rio de Janeiro.

The country is home to four funds specialized in Deep Tech, including Pitanga, the first fund in the region to focus exclusively on Deep Tech startups. Brazil also hosts a larger Deep Tech venture capital fund, GRIDs, which primarily focuses on investments overseas.

The country shows immense potential for Deep Tech innovation, holding 77% of the region's researchers, generating 58% of the patents, and accounting for 39% of the total venture capital investments in the region. However, this potential remains largely untapped due to the existing gap between university researchers and the venture capital community, a gap yet to be bridged with early-stage accelerators.

## Brazil highlights

**101**
Startups received VC funding

**$1.9B**
Ecosystem value

**4**
Top Deep Tech funds based in Brazil

**30%**
% of Deep Tech LAC startups

**23%**
% of Deep Tech LAC ecosystem value

**>40**
Generalist funds investing in Deep Tech in Brazil

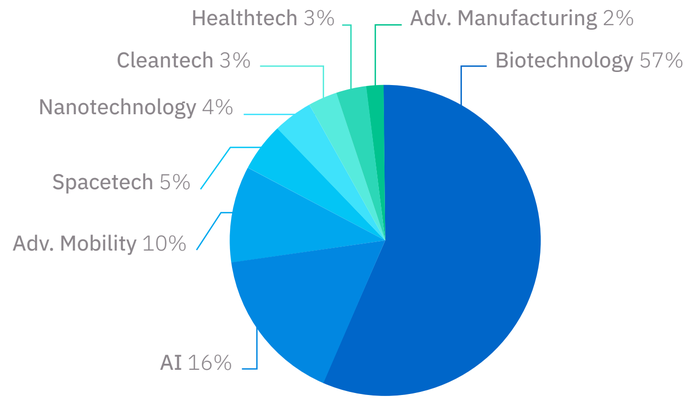
## Top Deep Tech startups based in Brazil

| Company | Sector | Valuation range | City |
|---|---|---|---|
| Kaiima | Biotech | $100-500M | Campinas |
| Biotimize | Biotech | $100-500M | São Paulo |
| Voltz | Advanced Mobility | $100-500M | Recife |
| Speedbird Aero | Spacetech | $100-500M | São Paulo |
| Tractian | IoT | $50-100M | São Paulo |

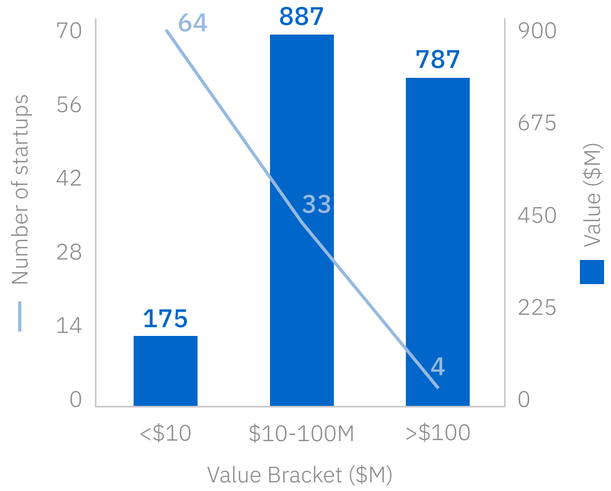
## Top Deep Tech funds investing in Brazil

VESPER · INDIE BIO · bossanova · fundopitanga · SECURITAS BIOSCIENCES

## Leading sectors by number of Deep Tech startups




## Number and value of startups per valuation range




*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis*

# Chile Deep Tech ecosystem overview

Chile boasts the most valuable Deep Tech ecosystem in Latin America and the Caribbean (LAC), with 65 startups (19%) that have received venture funding. Collectively, these startups are worth $2B, representing 25% of the ecosystem's value. Chile also stands out for its high density of deep tech startups in LAC, with 3.4 startups per million citizens.

The country's most successful Deep Tech startup, NotCo, uses AI to create plant-based food products. In addition, two more companies are estimated to be worth over $100M, and 18 startups are valued between $10M and $100M.

While biotech startups dominate in terms of number, accounting for over 50% of the total, AI leads in terms of value, largely due to NotCo's rapid growth.

A major factor behind Chile's vibrant Deep Tech sector is the presence of several active funds, notably The Ganesha Lab and Zentynel, both based in Santiago, the capital of Chile. These funds have not only fueled the growth of local startups but have also enhanced their international recognition. Consequently, over 20 international funds have been attracted to invest in the country.

Chile's ecosystem is further strengthened by government initiatives.

## Chile highlights

**65**
Startups received VC funding

**$2B**
Ecosystem value

**3**
Top Deep Tech funds based in Chile

**19%**
% of Deep Tech LAC startups

**25%**
% of Deep Tech LAC ecosystem value

**>20**
Generalist funds investing in Deep Tech in Chile

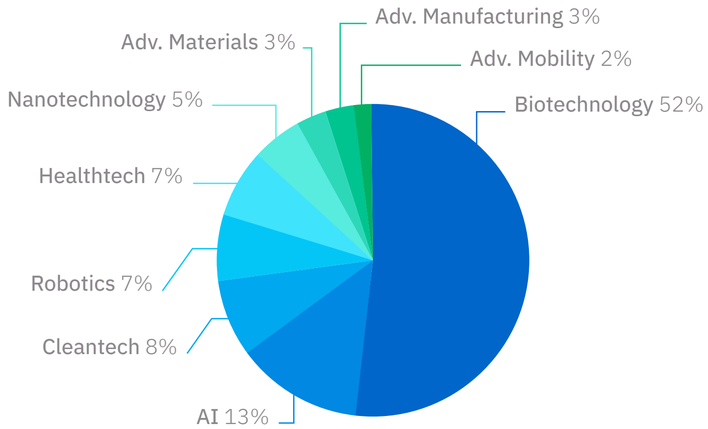
## Top Deep Tech startups based in Chile

| Company | Sector | Valuation range | City |
|---|---|---|---|
| NotCo | AI | $100-500M | Santiago |
| Phage Lab | Biotech | $100-500M | Santiago |
| Levita Magnetics | Robotics | $100-500M | Santiago |
| ThyroidPrint | Biotech | $50-100M | Santiago |
| Aintech | Nanotechnology | $50-100M | Santiago |

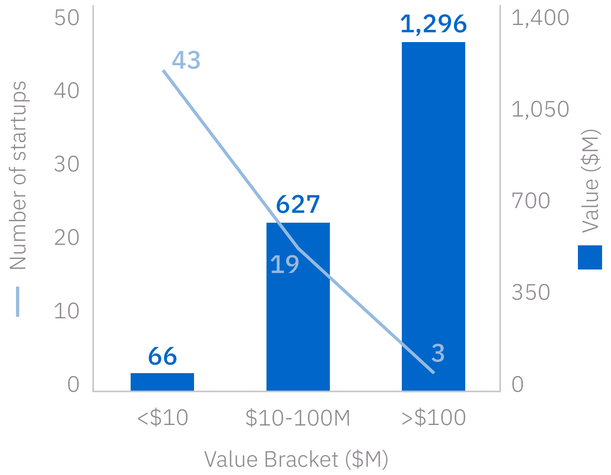
## Top Deep Tech funds investing in Chile

INDIE BIO · AURUS CAPITAL · VENTURANCE ALTERNATIVE ASSETS · zentynel FRONTIER INVESTMENTS · the GANESHA lab

## Leading sectors by number of Deep Tech startups




## Number and value of startups per valuation range




*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis*

# Costa Rica Deep Tech ecosystem overview

Costa Rica is home to Establishment Labs, the most valuable startup in the region. This innovative breast implant tech company contributes to over 20% of the total ecosystem value in LAC and accounts for 97% of Costa Rica's ecosystem value. Remarkably, Establishment Labs originated in the midst of the thriving multinational medical device manufacturing ecosystem located in the country's free zones.

Although Establishment Labs dominates in terms of value, five other startups, mostly in biotech, have received institutional venture funding. Most of these startups are based in the capital, San José, indicating a concentration of innovation and activity in this region.

Despite its small population, Costa Rica boasts a remarkable density of Deep Tech startups, with 1.2 startups per million citizens. This density is significant, especially when compared to larger countries like Brazil or Mexico.

Although there are no locally based Deep Tech-specific funds, Costa Rica has successfully attracted substantial investment from international funds and organizations. Entities such as SOSV and Carao Ventures have played critical roles in funding and fostering the growth of Costa Rican companies.

## Costa Rica highlights

**6**
Startups received VC funding

**$1.8B**
Ecosystem value

**1**
Top Deep Tech funds based in Costa Rica

**2%**
% of Deep Tech LAC startups

**22%**
% of Deep Tech LAC ecosystem value

**>5**
Generalist funds investing in Deep Tech in Costa Rica

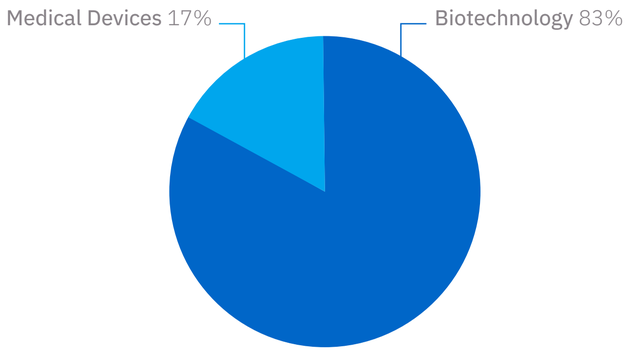
## Top Deep Tech startups based in Costa Rica

| Company | Sector | Valuation range | City |
|---|---|---|---|
| Establishment Labs | Med. devices | $1-5B | San José |
| ClearLeaf | Biotech | $10-25M | San José |
| Speratum | Biotech | $10-25M | San José |
| Cenibiot | Biotech | $10-25M | San José |
| Hemoalgae | Biotech | $0-1M | Cartago |

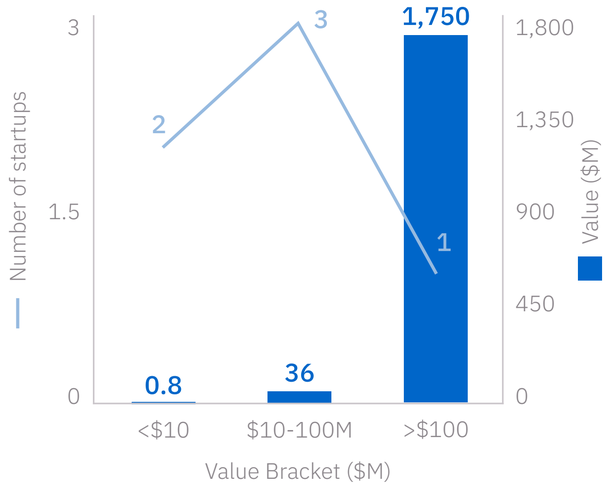
## Top Deep Tech funds investing in Costa Rica

SOSV carao ventures REBELBIO

## Leading sectors by number of Deep Tech startups




## Number and value of startups per valuation range




*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis*

# Mexico Deep Tech ecosystem overview

Mexico's deep tech ecosystem exhibits one of the lowest concentrations of startups among countries in LAC. With its large population, vibrant manufacturing and venture capital sectors, Mexico only has 0.2 startups per million citizens. The country has 30 Deep Tech startups (9% of the region) that represent around $300M (4%) of the value of the regional ecosystem.

Regrettably, Mexico lacks venture capital funds specifically focused on Deep Tech startups, and there's a noticeable absence of substantial public initiatives dedicated to nurturing this sector of the startup ecosystem. Similarly, local universities offer limited support for advancing Deep Tech innovation within the country, with Tecnológico de Monterrey standing out as a notable exception.

Most existing startups (74%) are focused on biotech and are worth less than $10M, with only 8 startups above that threshold.

In contrast to other cases in LAC, Mexico's deep tech startups are being founded nationwide. This distribution reflects a decentralized approach to entrepreneurship and innovation, similar to what is observed in Brazil. This decentralized foundation contributes to the overall diversity and resilience of Mexico's deep tech ecosystem.

## Mexico highlights

**30**
Startups received VC funding

**>$300M**
Ecosystem value

**5**
Top Deep Tech funds based in Mexico

**9%**
% of Deep Tech LAC startups

**4%**
% of Deep Tech LAC ecosystem value

**>20**
Generalist funds investing in Deep Tech in Mexico

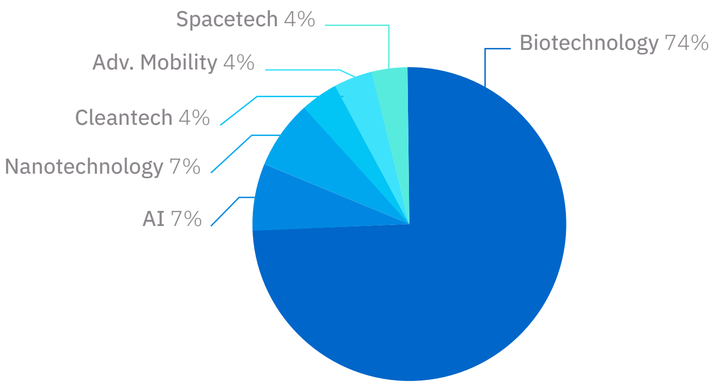
## Top Deep Tech startups based in Mexico

| Company | Sector | Valuation range | City |
|---|---|---|---|
| Sistema.bio | Cleantech | $50-100M | Mexico City |
| Eva | Biotech | $50-100M | Puebla |
| Agrorganica | Biotech | $25-50M | Jalisco |
| Polybion | Biotech | $25-50M | Irapuato |
| PROSPERiA | Biotech | $10-25M | Mexico City |

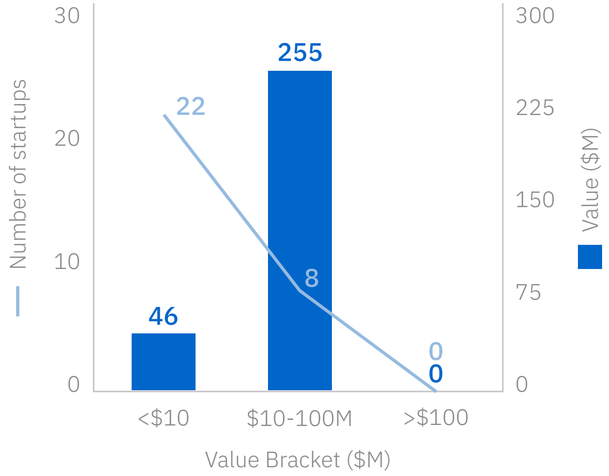
## Top Deep Tech funds investing in Mexico

INDIE BIO GRIDX AVALANCHA LABCAP the GANESHA lab

## Leading sectors by number of Deep Tech startups




## Number and value of startups per valuation range




*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis*

# Colombia Deep Tech ecosystem overview

With a mere 0.2 startups per million citizens, Colombia's Deep Tech ecosystem encompasses only nine startups that have received venture capital funding, representing a scant 3% of the region's total. Collectively, they're valued at less than $100M, contributing less than 1% of the total value of the region's Deep Tech startups. Despite their limited number, these startups span across several sectors, including biotech, AI, and advanced mobility.

Although Colombia boasts a substantial venture capital ecosystem, it lacks funds specialized in Deep Tech, leaving startups heavily reliant on overseas funding. This situation exposes significant untapped potential within Colombia, suggesting room for growth and development. Despite the current landscape, the high level of activity in other technological sectors, such as fintech, attests to an appetite for active innovation in the country.

On the academic front, El Bosque University has established an innovation, education, and entrepreneurship hub known as HUB-iEX, where academics and entrepreneurs collaborate to enhance innovation performance and business growth. As part of this initiative, the university also established a technology transfer office, which is progressively implementing a promising multi-pronged strategy to accomplish its goals.

## Colombia highlights

**9**
Startups received VC funding

**>$50M**
Ecosystem value

**0**
Top Deep Tech funds based in Colombia

**3%**
% of Deep Tech LAC startups

**1%**
% of Deep Tech LAC ecosystem value

**>5**
Generalist funds investing in Deep Tech in Colombia

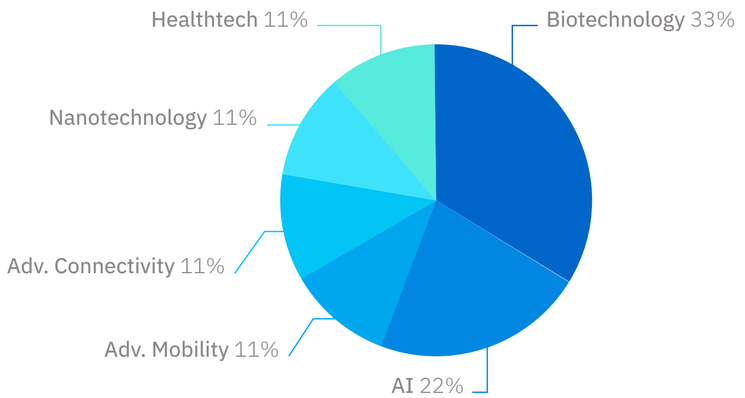
## Top Deep Tech startups based in Colombia

| Company | Sector | Valuation range | City |
|---|---|---|---|
| Somos Internet | Adv. Connectivity | $25-50M | Medellin |
| Samay | Healthtech | $10-25M | Antioquia |
| AerocarveUS | Advanced Mobility | $10-25M | Bogota |
| Progal | Biotech | $1-5M | Medellin |
| Fungi Life | Biotech | $1-5M | Medellin |

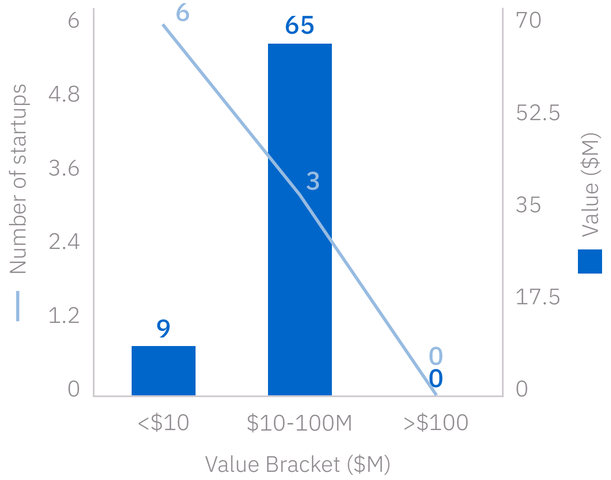
## Top Deep Tech funds investing in Colombia

GRIDX · the GANESHA lab · zentynel FRONTIER INVESTMENTS

## Leading sectors by number of Deep Tech startups




## Number and value of startups per valuation range




*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis*

# Uruguay Deep Tech ecosystem overview

Uruguay's Deep Tech ecosystem has shown significant progress in recent years. With 11 startups, the country boasts a ratio of 3.2 startups per million citizens, more than 15 times that of Mexico or Colombia.

As seen in most countries in LAC, biotech is the dominant sector in Uruguay, accounting for 90% of local Deep Tech startups. Most Uruguayan startups are still in the early stages of development.

Most of the local startups are still in their early stage of development, some show significant global potential due to their innovative solutions.

The recent emergence of local Deep Tech-specific funds like Khem and Lab+ provides support and resources, thereby fueling innovation and entrepreneurship in the sector.

The country offers not only a friendly and stable market environment but also free zones that facilitate global operations for Deep Tech startups. A host of policies promoting innovation, including favorable tax schemes and partnerships with global corporations, such as a partnership with Microsoft to develop a regional AI lab, further bolster Uruguay's Deep Tech ecosystem.

Currently, the country is developing an innovation hub focused on advanced digital innovation, renewables, and life sciences, along with a $30M matching funds program.

## Uruguay highlights

**11**
Startups received VC funding

**>$20M**
Ecosystem value

**2**
Top Deep Tech funds based in Uruguay

**3%**
% of Deep Tech LAC startups

**<1%**
% of Deep Tech LAC ecosystem value

**>5**
Generalist funds investing in Deep Tech in Uruguay

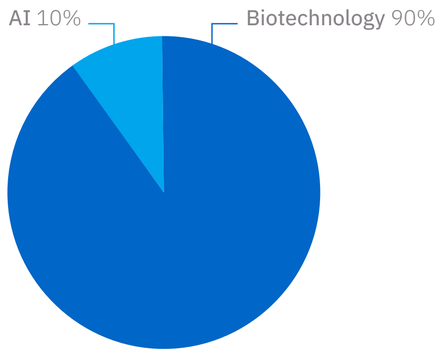
## Top Deep Tech startups based in Uruguay

| Company | Sector | Valuation range | City |
|---|---|---|---|
| Metabix Bio | AI | $1-5M | Montevideo |
| Ecosativa | Biotech | $1-5M | Montevideo |
| Enteria | Biotech | $1-5M | Montevideo |
| Germinar | Biotech | $1-5M | Montevideo |
| BentenBiotech | Biotech | $1-5M | Montevideo |

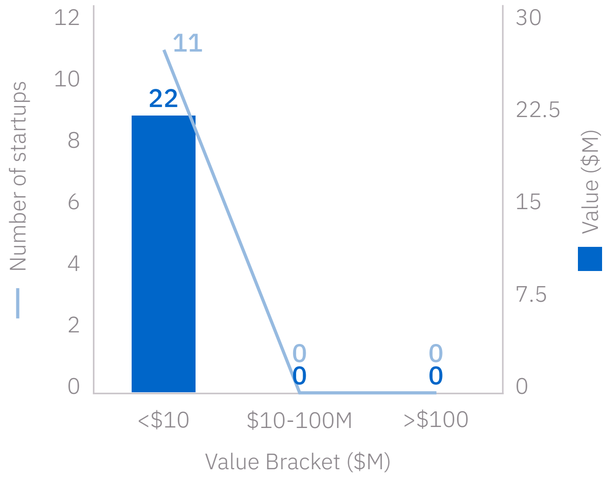
## Top Deep Tech funds investing in Uruguay

khem® GRIDX the GANESHA lab LAB venture builder

## Leading sectors by number of Deep Tech startups




## Number and value of startups per valuation range




*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis*

*Image: Lilium*

**Appendix**

# START UP PROFILES

*Image: Lilium*

In the following pages, we present a series of startup profiles from the ALC Deep Tech ecosystem. The objective is to illustrate the power and diversity of technologies that are being developed in the region. We portray startups from different geographical origins and at different stages of development, including some of the most valuable companies, as well as some early-stage startups.

This selection does not imply any judgment about the future value of these companies. Although we had direct access to most of the selected startups, some of the profiles are based on secondary sources such as databases, web pages, and press articles.


# Establisment Labs

Medical Devices

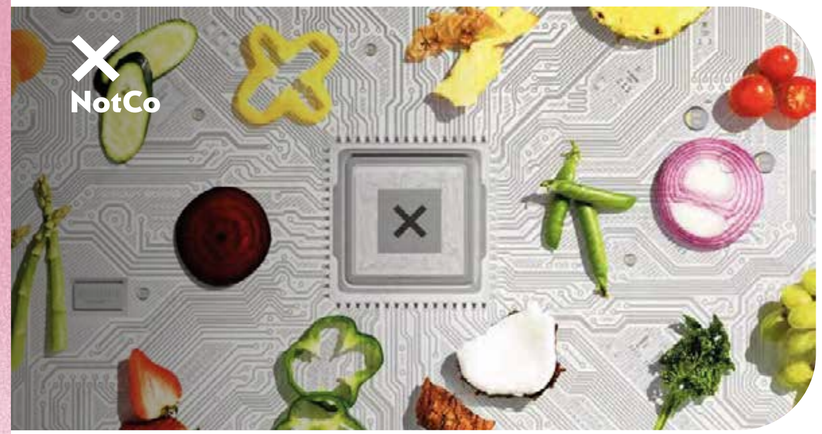
## Breakthrough minimally-invasive next-generation breast implants

Establishment Labs is a medical technology company that designs, develops, manufactures, and markets an innovative portfolio of silicone gel-filled breast implants branded as Motiva Implants®. Motiva Implants are approved for commercial distribution in over 70 countries through exclusive distributors or a direct salesforce. Establishment Labs has 25 patent families and 200 global patent applications across 25 jurisdictions.

### Establisment Labs operational footprint


| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2004 | IPO | Global | >200 | >$500M | >$100M | Juan Jose Chacon-Quiros | NIH, Madryn, CZ Chan Zuckerberg Initiative, JW Asset Managem, Bill & Melinda Gates Foundation |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*



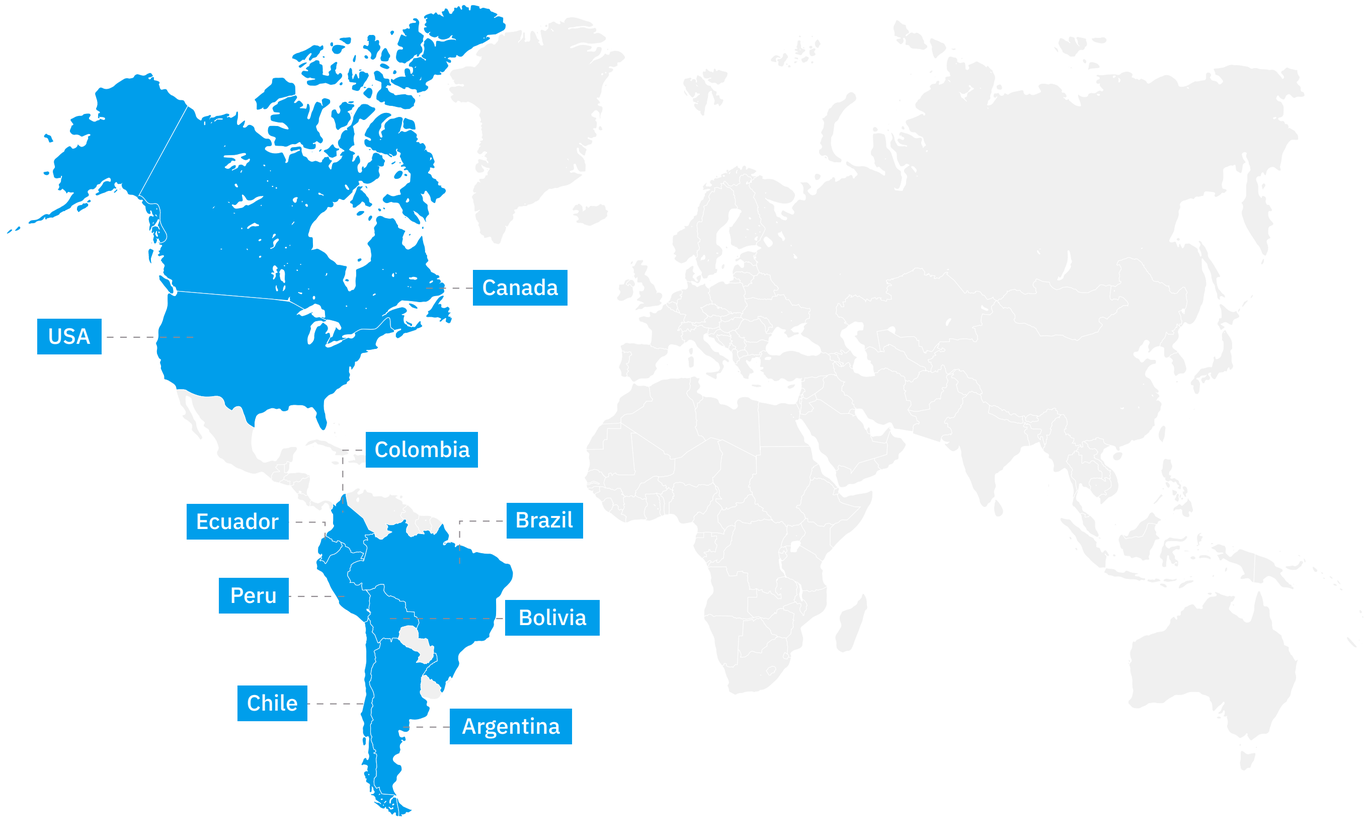

# NotCo

Artificial Intelligence

## Artificial intelligence food technology used to create plant-based alternatives to animal products

NotCo is the second most valuable company in LAC. The company's groundbreaking technology has the potential to revolutionize the food industry by making it possible for people to eat more sustainably without sacrificing taste. NotCo's products are indistinguishable from their animal-based counterparts but have a much smaller environmental impact. NotCo is on a mission to make plant-based eating the norm.

NotCo operational footprint




**Founded**
2015

**Stage**
Late Stage

**Market scope**
Global

**Employees**
>200

**Value**
>$500M

**Capital raised**
>$100M

**Founders**
Matias Muchnick
Karim Pichara
Pablo Zamora

**Investors**
KASZEK, INDIE BIO, BEZOS EXPEDITIONS, GENERAL CATALYST, CRAFTERS, FPC FUTURE POSITIVE CAPITAL

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

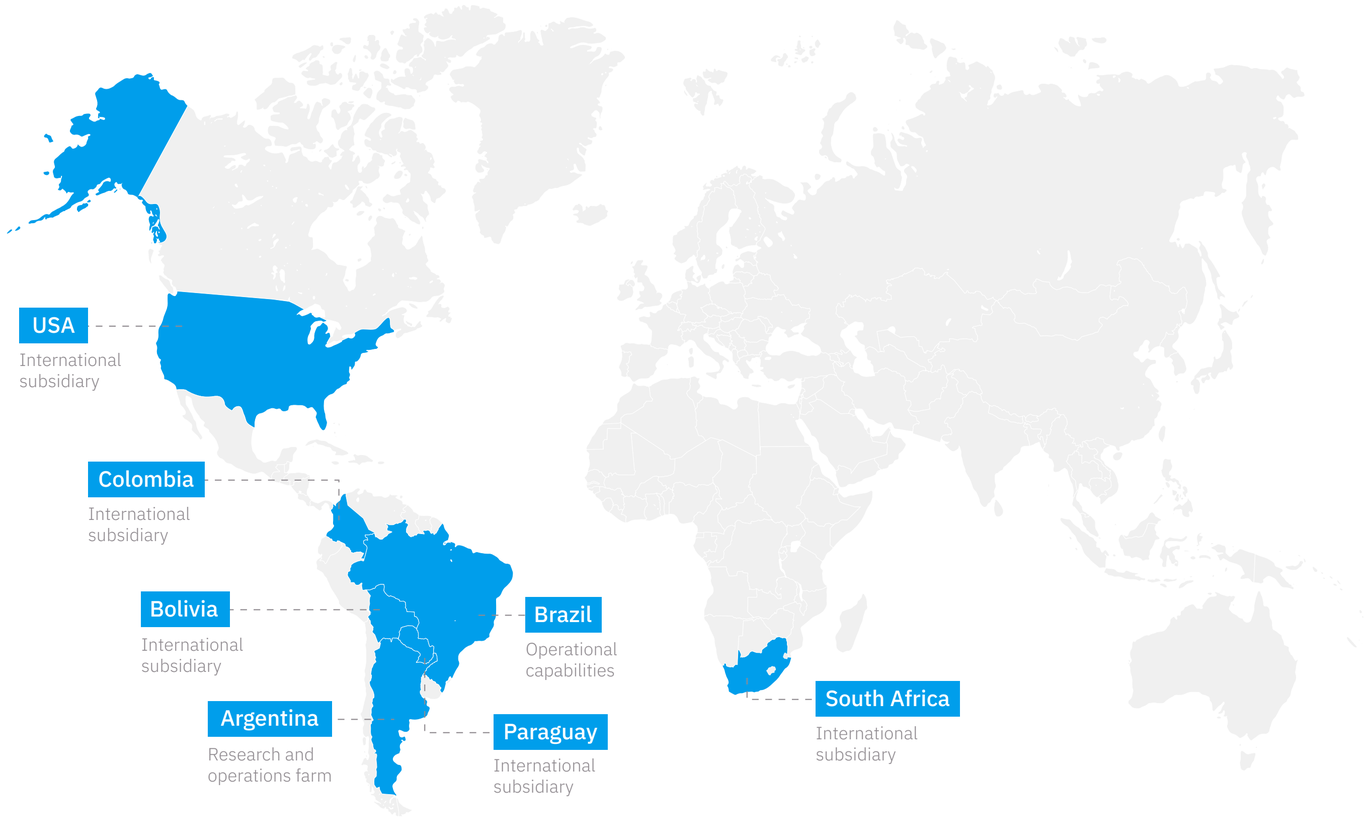

# Bioceres

Biotech

## Bioceres is an agricultural biotechnology company that is changing the way we grow food

Bioceres' solutions incentivises the adopt of environmentally friendly production practices with a highimpact platform, patented technologies for seeds and microbial ag-inputs and next generation crop nutrition and protection solutions. Along with its HB4® – drought tolerant seed technology program, Bioceres is provides end-to-end traceability for production outputs.

### Bioceres operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | CEO | Investors |
|---|---|---|---|---|---|---|---|
| 2001 | IPO | Global | >200 | >$500M | >$100M | Federico Trucco | Bioceres is a public company listed in NASDAQ |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

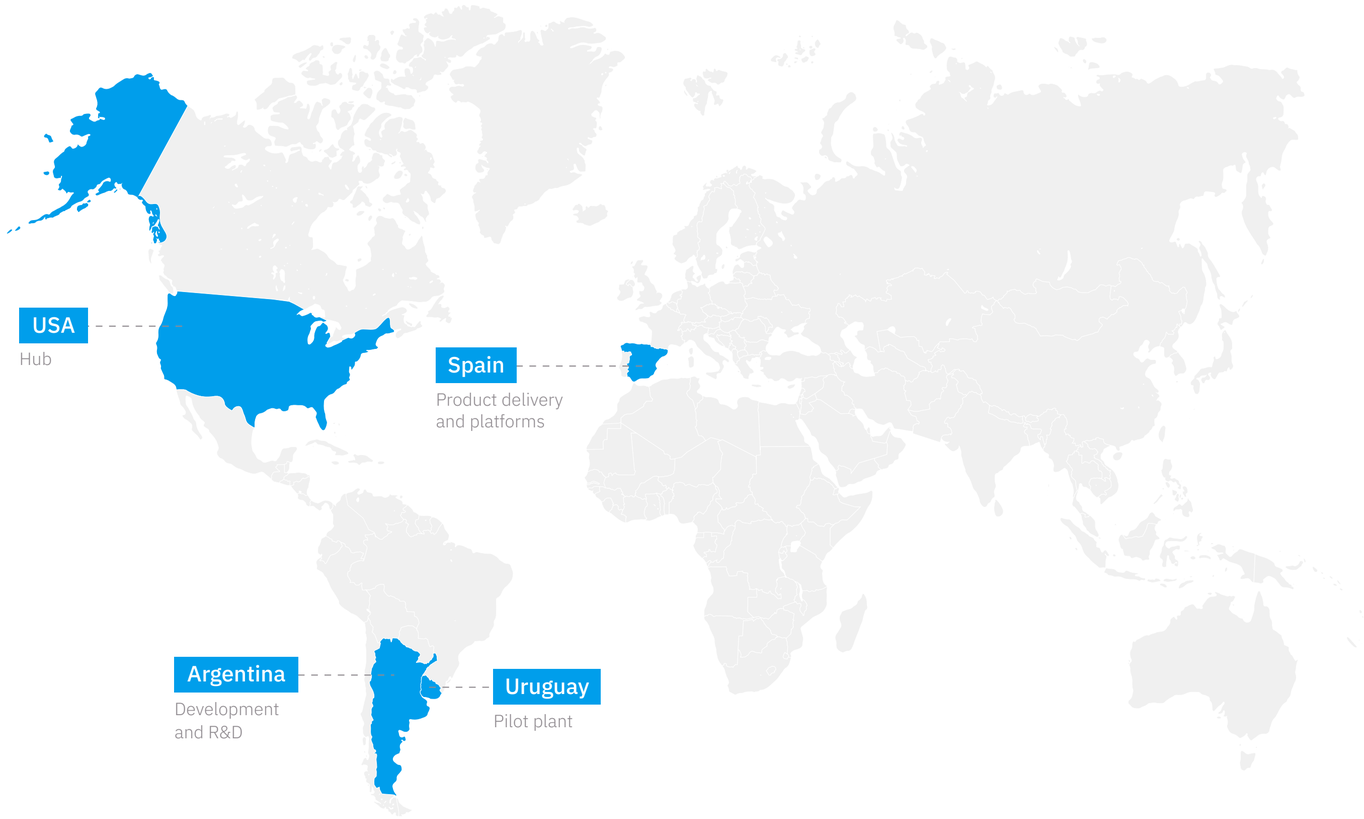

# Satellogic

Spacetech

## High-resolution Low Earth Orbit (LEO) satellite constellation for affordable Earth Observation data

Satellogic is building the first scalable Earth Observation platform with the ability to remap the entire planet at both high frequency and high resolution Their innovative approach allows them to provide high quality geospatial data at a more competitive price-point, making it more accessible to various industries and governments and enabling better decision- making at scale. They have 34 operational spacecrafts in orbit.

### Satellogic operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders |
|---|---|---|---|---|---|---|
| 2010 | IPO | Global | >200 | >$100M | >$100M | Emiliano Kargieman<br>Gerardo Richarte |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

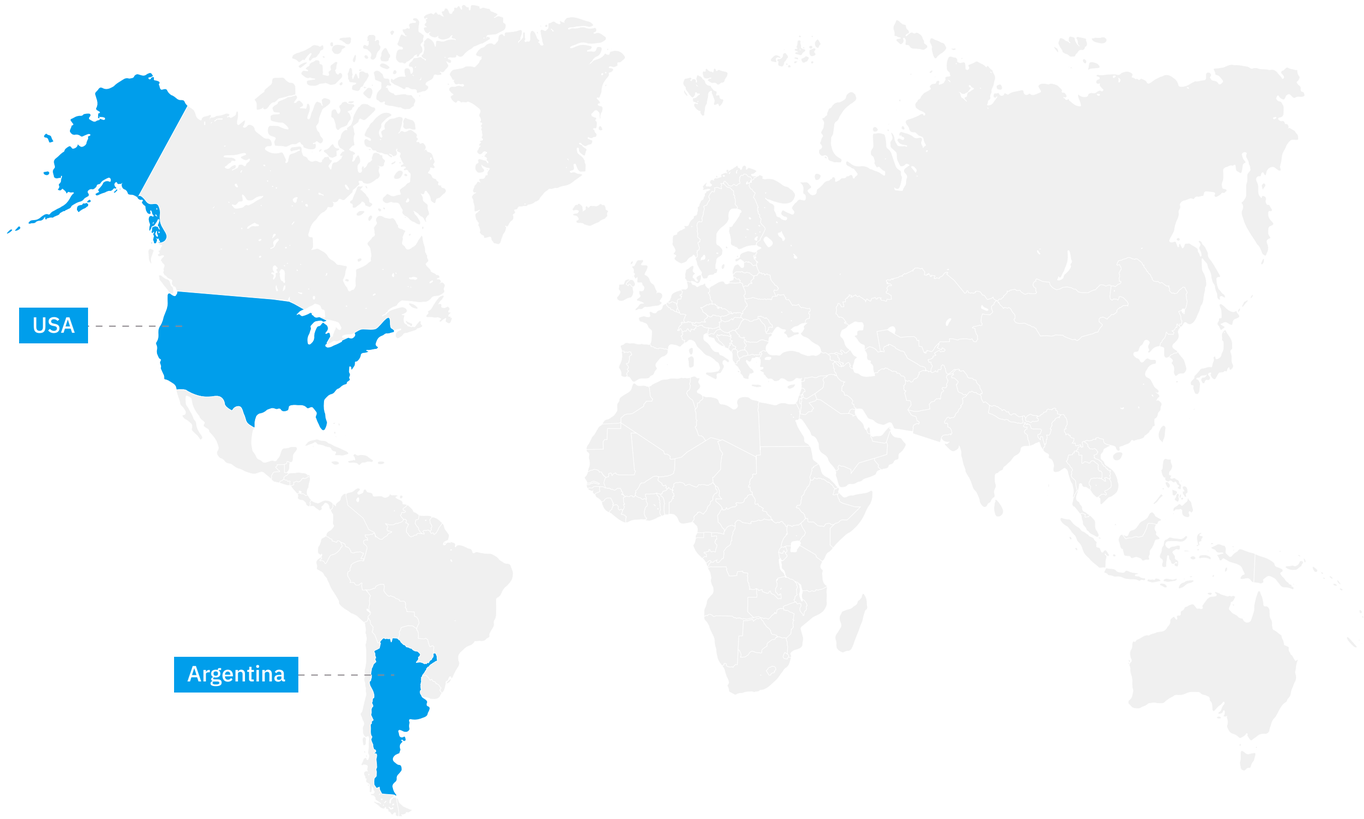

# Stämm

Biotech

## Downsizing a whole biotech facility into an all-in-one, plug-n-play desktop unit

Stämm is a biotechnology company that makes biomanufacturing easy, scalable, and repeatable. They have developed the first methodology for continuous industrial production of biologics and cell therapies leveraging microfluidics and 3D printing. Stämm's goal is to decentralize bioprocesses and democratize access to biotechnology products, thus freeing their partners to focus on the disruptive discoveries that impact people's lives.

Stämm operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2014 | Series A | Global | >150 | >$100M | >$10M | Federico D'Alvia Vegh<br>Yuyo Llamazares | GRIDX, INDIE BIO, Draper Cygnus, air capital, SOSV, VARANA CAPITAL |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

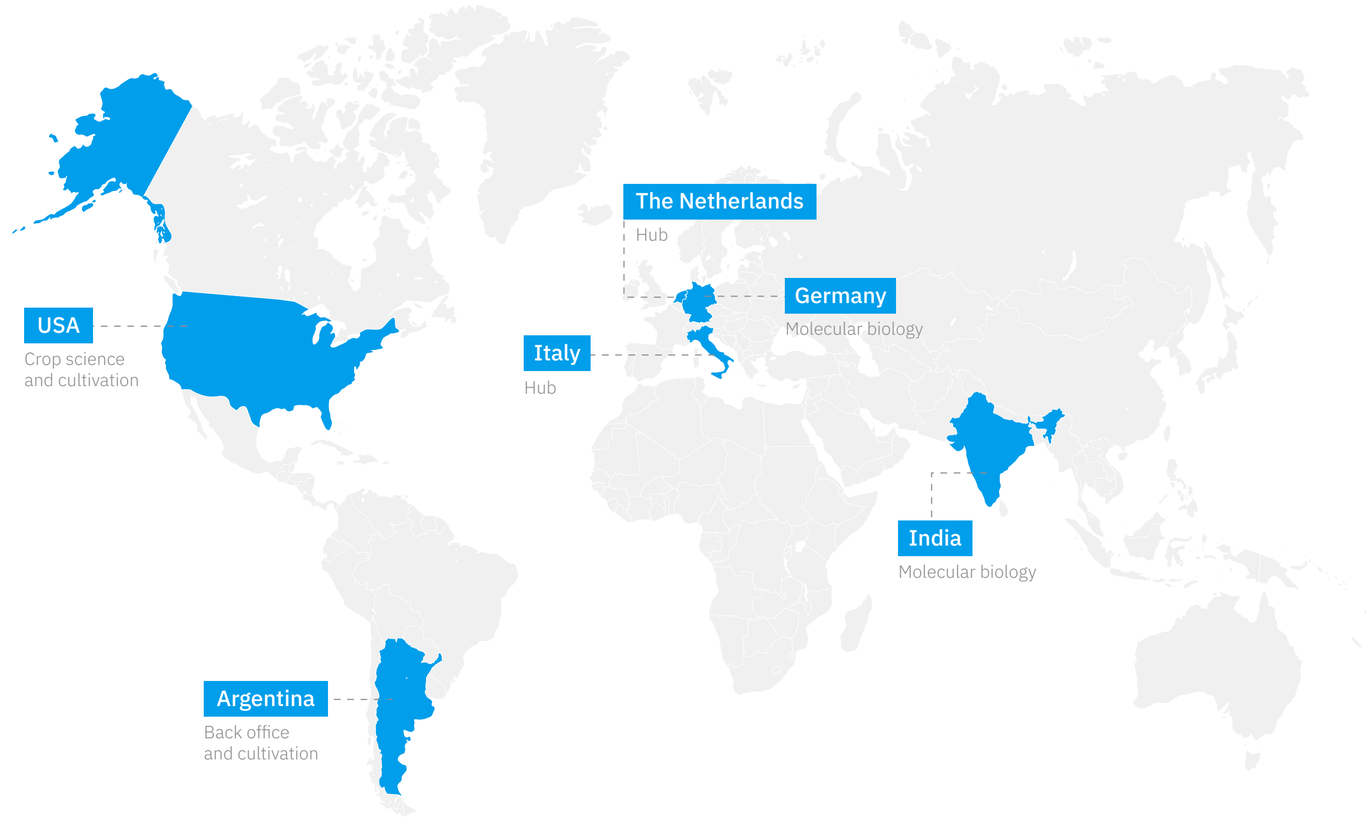

# Moolec

Biotech

## Genetically modified plants that produce real animal proteins that can serve as ingredients for plant-based food products

Moolec is working on Molecular Farming, a disruptive technology in the alternative protein landscape, to make animal-free proteins more accessible and affordable for everyone. Moolec's products could significantly impact food production and its environmental footprint by reducing the need for animal agriculture.

### Moolec operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2020 | IPO | Global | >50 | >$100M | >$10M | Gaston Paladini<br>Martin Salinas<br>Henk Hoogenkamp | BIOCERES |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

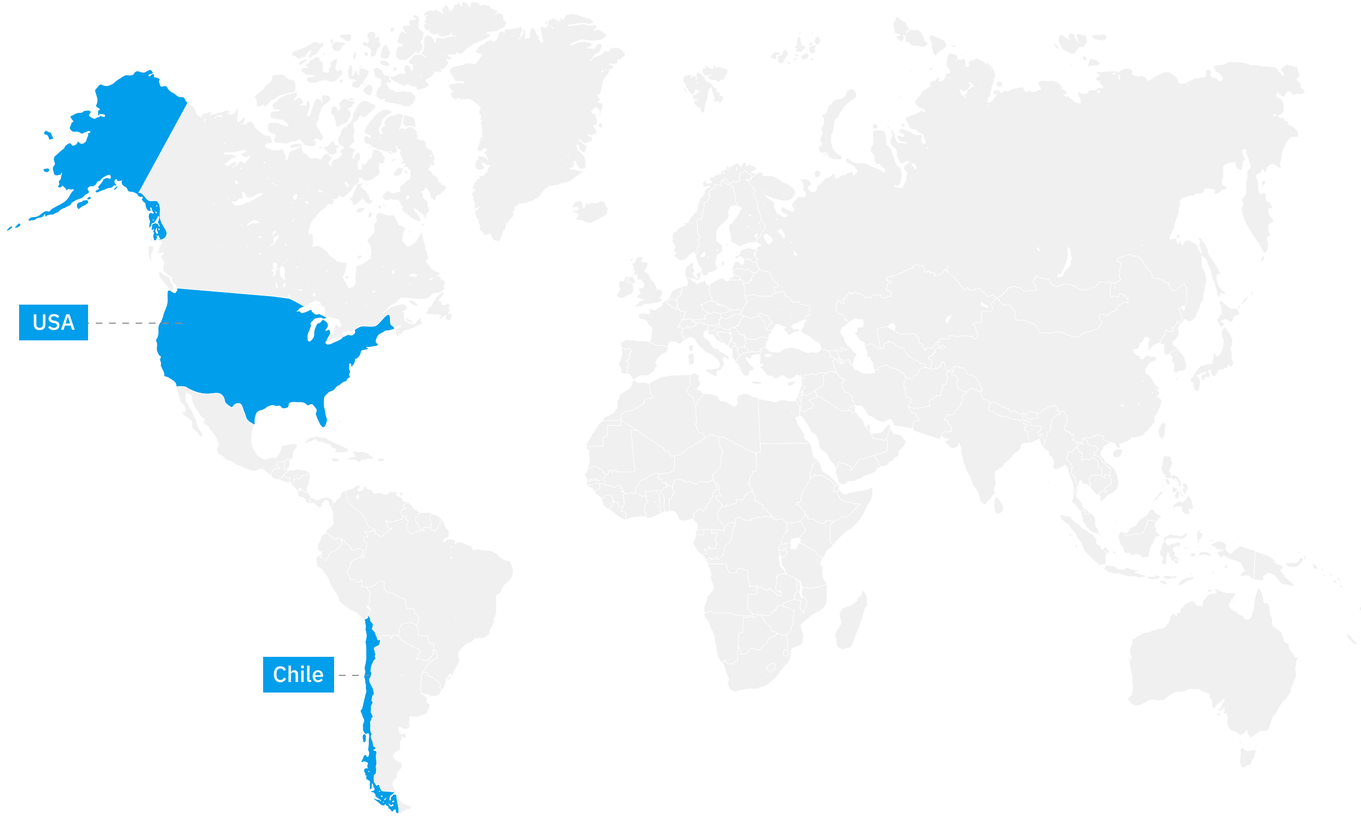

# Zippedi

Robotics

## AI-powered robots for real-time retail and consumer product inventory management

Zippedi's robots can automatically scan shelves for out-of-stock products, incorrect prices, and misplaced items to automate age-old retail problems and improve customer service. Zippedi provides retailers and CPG manufacturers with accurate, actionable data and customer behavior patterns to help them increase sales, labor efficiency, and customer shopping experience.

Zippedi operational footprint




**Founded**
2017

**Stage**
Series A

**Market scope**
Global

**Employees**
>100

**Value**
>$25M

**Capital raised**
>$10M

**Founders**
Alvaro Soto
Ariel Schikrut
Luis Vera

**Investors**
FONDO ALERCE · FCh FUNDACIÓN CHILE · endeavor CATALYST · Magical · GEN 1 CAPITAL · CHILE GLOBAL VENTURES FCh · grep -vc

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*


# Partanna

Cleantech

## Produced with minimal carbon emissions, Partanna is building a material that removes carbon from the atmosphere

Partanna is a technology company that has developed a revolutionary new building material that is carbon negative. The material is made from recycled materials and seawater, which can absorb atmospheric carbon dioxide over its lifetime. This makes Partanna's material a powerful tool for fighting climate change and can potentially revolutionize the construction industry.

### Partanna operational footprint


| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2021 | Seed | Global | <10 | >$25M | >$10M | Rick Fox<br>Sam Marshall | CHERUBIC VENTURES |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

# IOV Labs

Blockchain

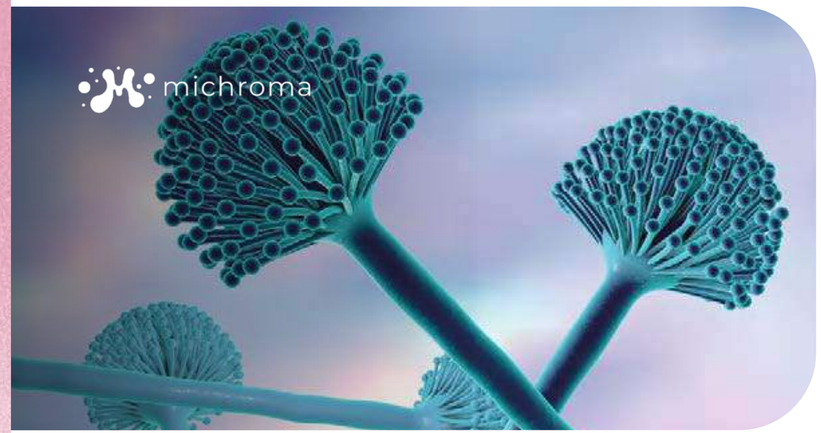
## Low-cost, highly secure, easy-to-use blockchain networks for the new global economy

IOV Labs builds disruptive, decentralized blockchain technologies to enable access to a secure and fair financial system and the opportunity for all to participate and prosper from it. IOVlabs, one of the global blockchain technology leaders, works to extend the possibilities of Bitcoin beyond being a store of value and help the ecosystem become a full-fledged financial system.

IOV Labs operational footprint


| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2014 | Seed | Global | >100 | NA | NA | Diego G. Zaldivar<br>Sergio D. Lerner | 8DECIMAL CAPITAL, >Nxtp.Labs, BITMAIN, BITFURY |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*



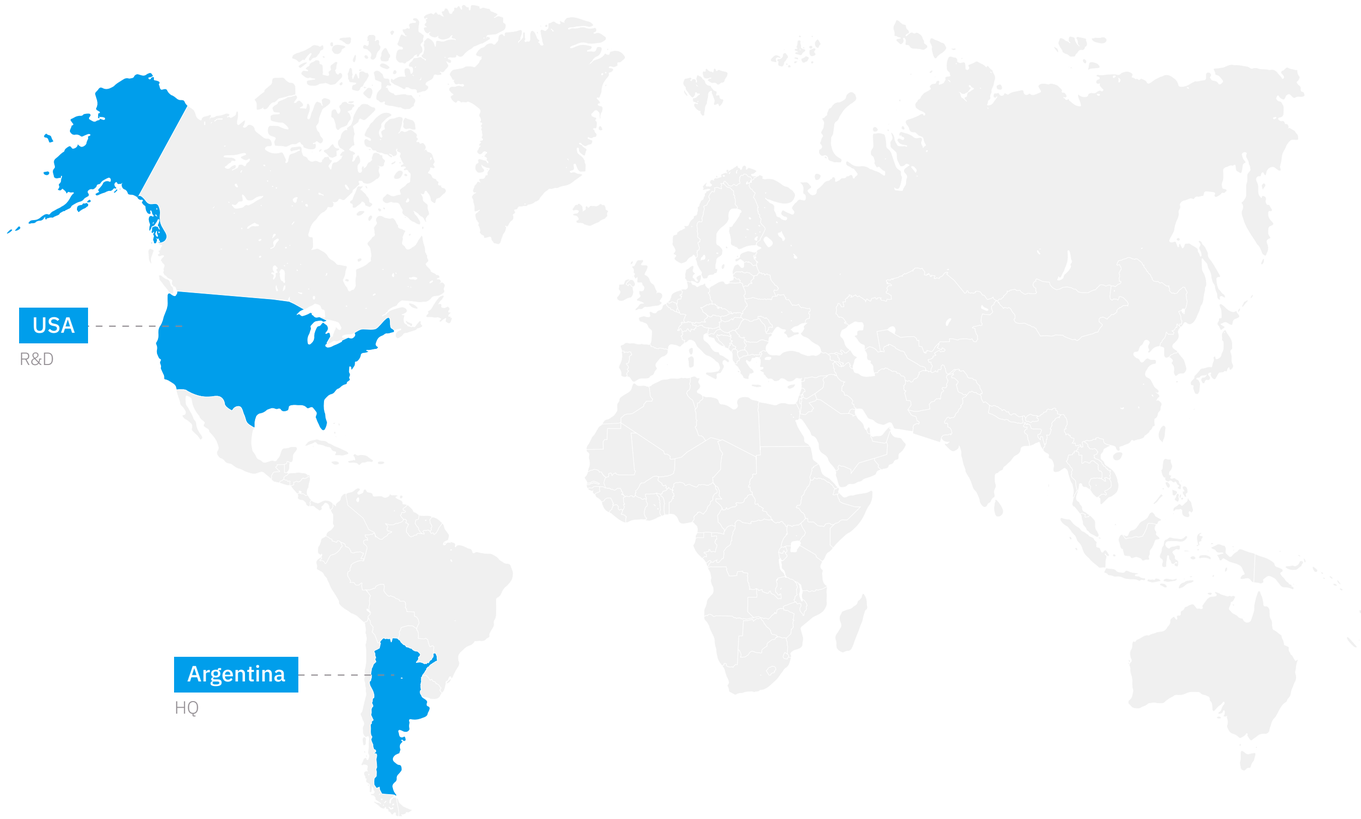

# Michroma

Advanced manufacturing

## The next generation of natural ingredients harnessing fungi, the most powerful biofactory in nature

Michroma uses precision fermentation to produce natural food ingredients used in various products, including baked goods, beverages, confectionery, meat, and dairy, as well as in the fragrance and pharmaceutical industries. The company's non-GMO products offer a clean-label alternative to synthetic food ingredients. Michroma's microbe/fungi-based compounds are more environmentally friendly and economically viable.

Michroma operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2019 | Seed | Global | >10 | >$25M | >$5M | Mauricio Braia<br>Ricky Cassini | GRIDX, INDIE BIO, SOSV, Fen Ventures., MASSCHALLENGE |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

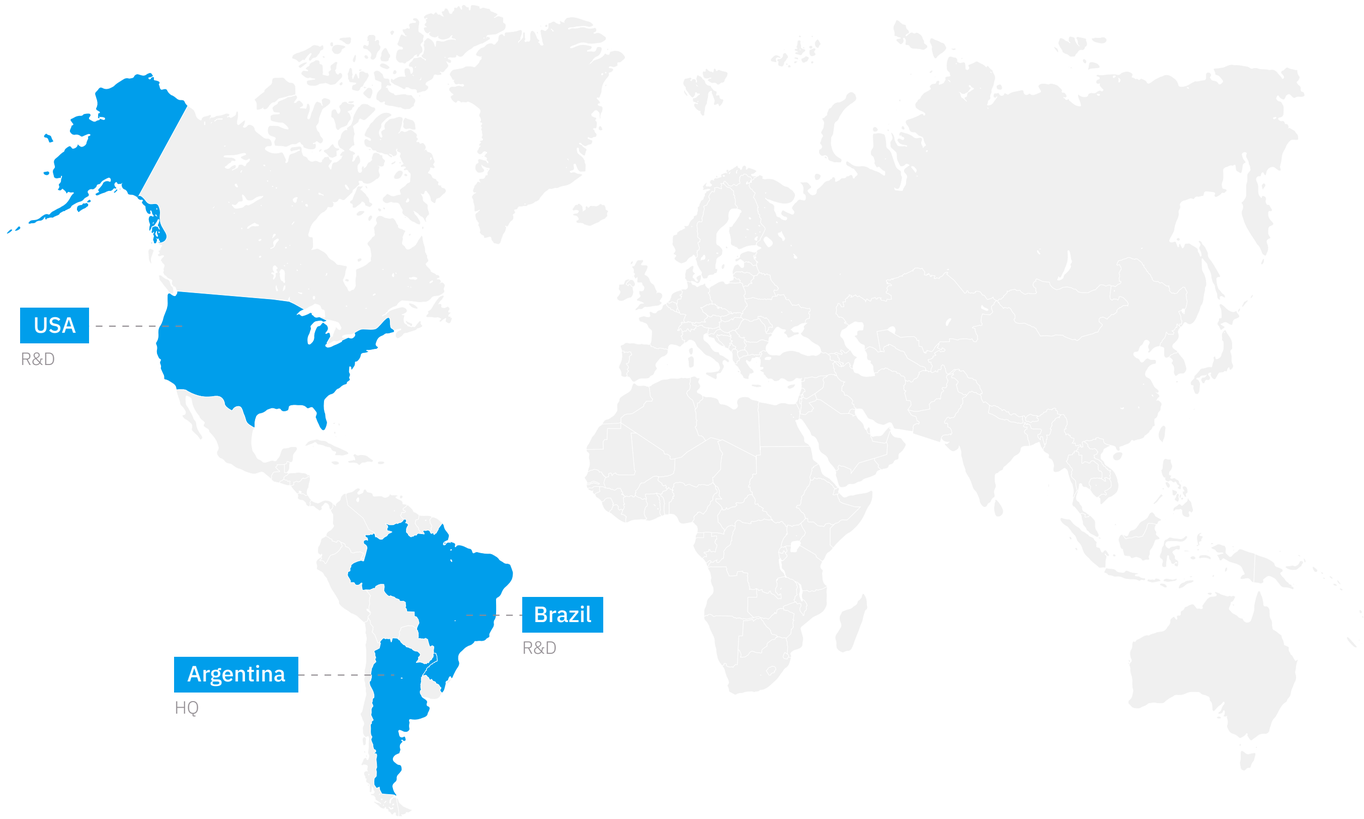

# Puna Bio

Biotech

## Using microbes from the Puna to increase crop yields, reduce carbon emissions, and restore degraded soil

Puna Bio leverages extremophiles taken from one of the harshest deserts in the world to improve crop yields and soil health, producing more food with fewer resources and enhancing sustainability and resilience in agriculture. Puna Bio's products are designed to help farmers grow crops in difficult conditions, such as in areas with poor soil quality or high salinity levels, and to improve yields in highly productive areas.

Puna Bio operational footprint




**Founded**
2020

**Stage**
Seed

**Market scope**
Global

**Employees**
>10

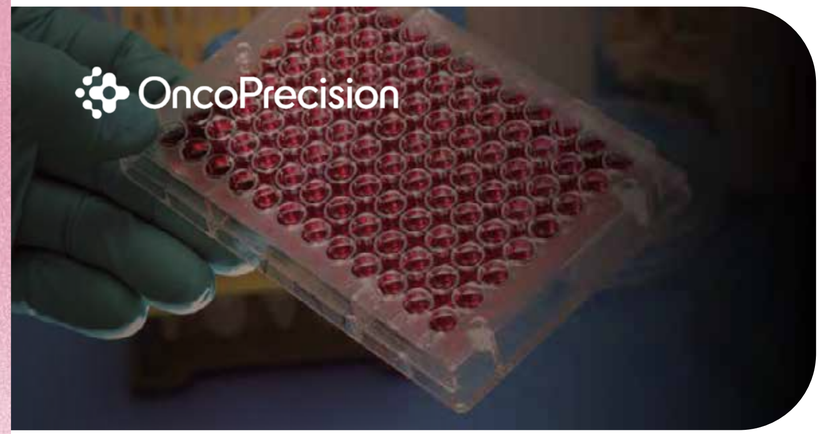
**Value**
>$10M

**Capital raised**
<$5M

**Founders**
Franco M. Levis
M. Eugenia Farias
Elisa Bertini
Carolina Belfiore

**Investors**
GRIDX, INDIE BIO, At One Ventures, air capital, SOSV, SPventures

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*



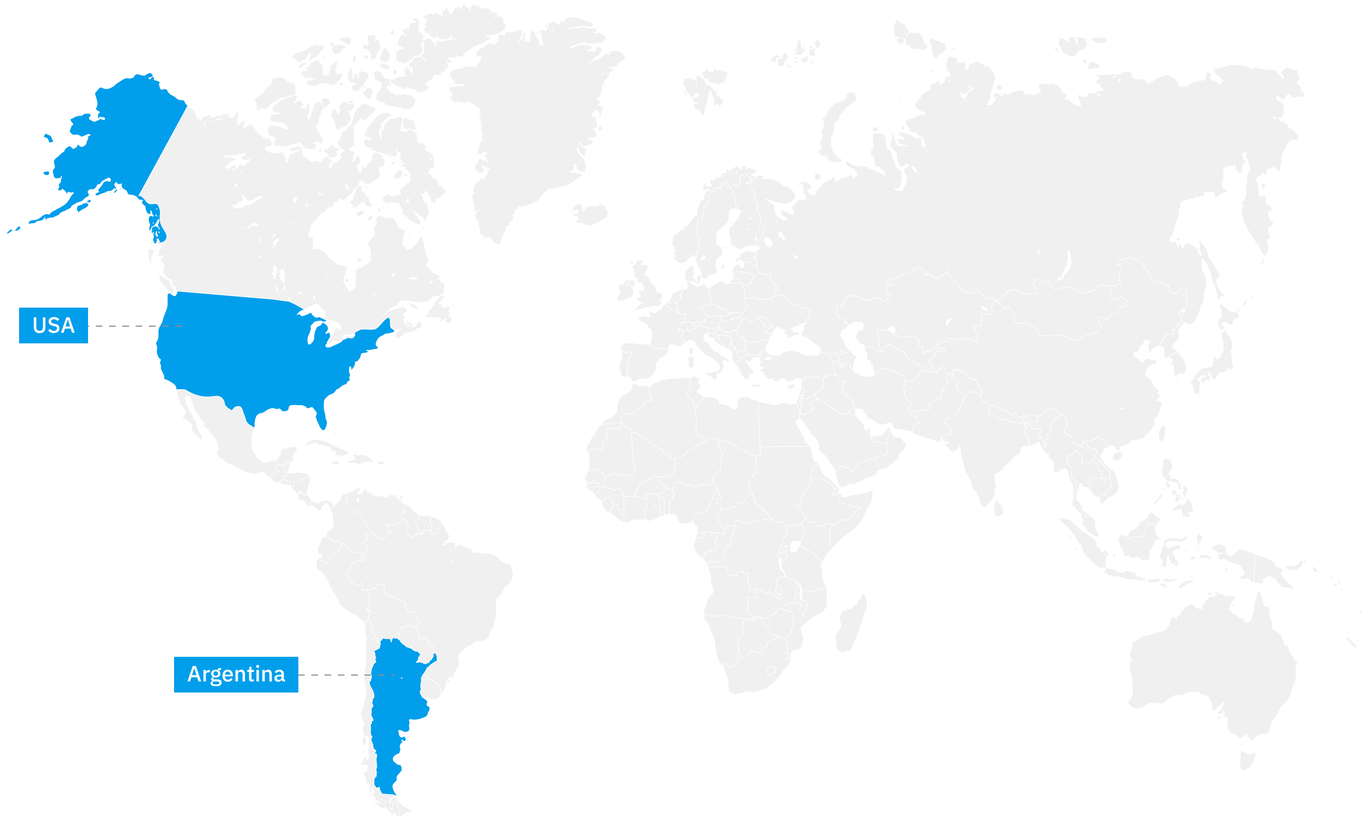

# OncoPrecision

Biotech

## Patient Micro Avatars to eliminate trial and error in oncology

OncoPrecision developed a platform that allows for the creation of “Patient Micro Avatars” from cancer patient biopsies to predict the efficacy of treatments with the goal of dramatically improving outcomes. Through its platform, OncoPrecision hopes to help oncologists prescribe therapies with the highest probability of success by ranking the activity of the different therapies evaluated, and to help the pharmaceutical industry develop treatments in a more agile and effective way.

Onco Precision operational footprint




**Founded**
2020

**Stage**
Seed

**Market scope**
Global

**Employees**
>10

**Value**
>$10M

**Capital raised**
<$5M

**Founders**
Gaston Soria
Candelaria L. de los Rios
Gerardo Gatti
Tarek A. Zaki

**Investors**
GRIDX, INDIE BIO, Draper Cygnus, CREATIVE VENTURES, SOSV, NEW YORK STATE OF OPPORTUNITY.

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see ‘Terminology and methodology’ Appendix)*


# Nintx

Biotech

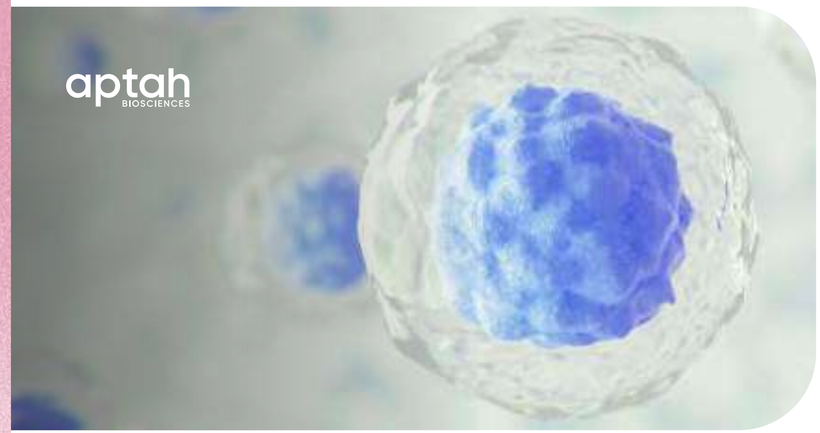
## Translating Brazilian biodiversity into novel therapies

Nintx is working with intra and inter-species (plants and microorganisms) biology to create the next generation of therapies using plant-based natural products with the potential to serve as a platform to modulate human biological targets and the microbiome concomitantly. The Brazilian biotech company is developing new drugs against multifactorial diseases, which are caused by both genetic and environmental factors and interactions between them (including interactions via the human microbiome), such as inflammatory, cardiovascular, neurological and oncological disorders.

Nintx operational footprint


| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2021 | Seed | Global | <10 | >$10M | <$5M | Miller Freitas<br>Cristiano Guimares | pitanga |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*



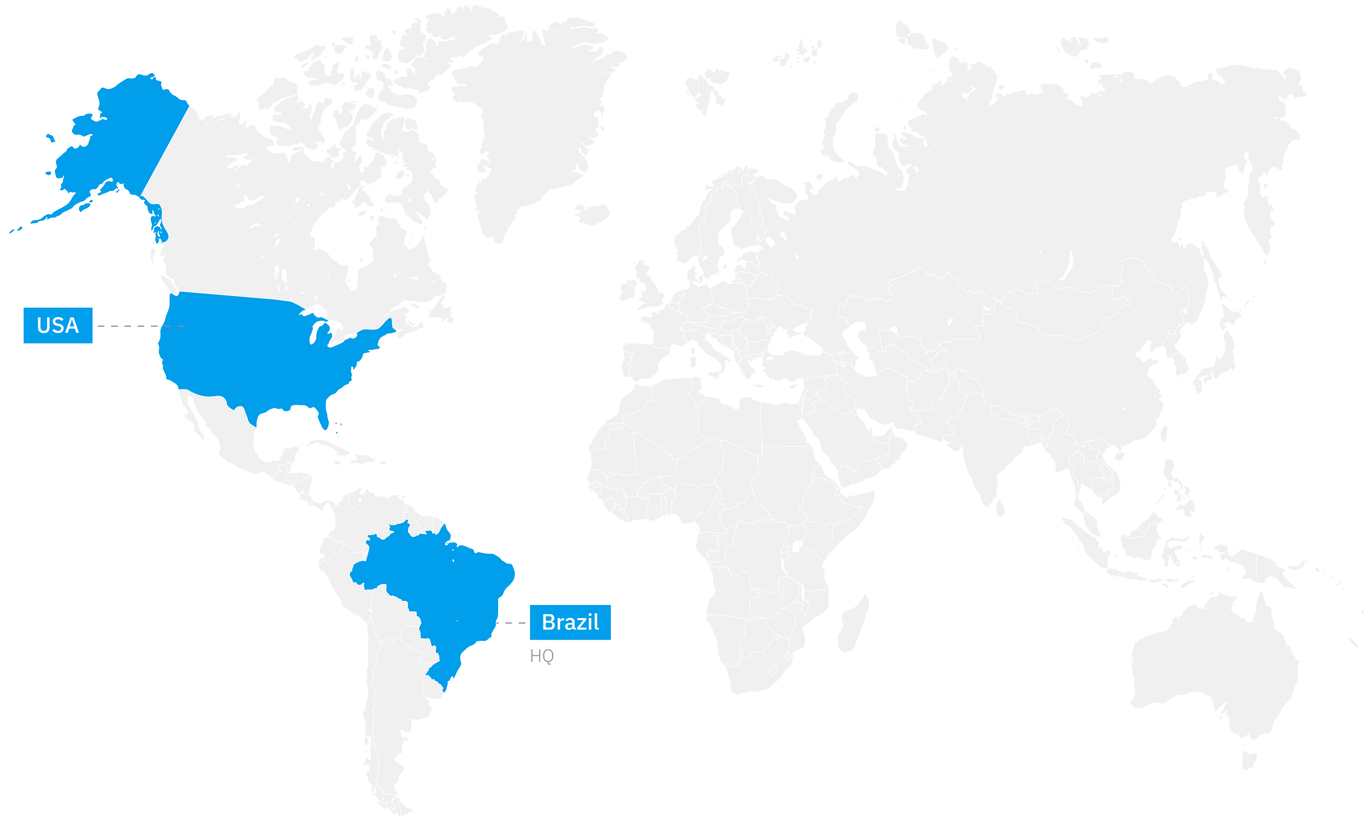

# Aptah

Biotech

## Novel RNA therapies targeting cancer and neurodegenerative diseases

Aptah uses cutting-edge technology to develop and commercialize novel RNA therapies designed to modulate the spliceosome machinery. This could lead to new treatments for cancer, neurogenerative diseases, such as Alzheimer's, that are more effective and have fewer side effects than current therapies.

Aptah operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2018 | Seed | Global | <10 | >$25M | <$5M | Caio Real<br>Rafael M. Bottos | VESPER |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

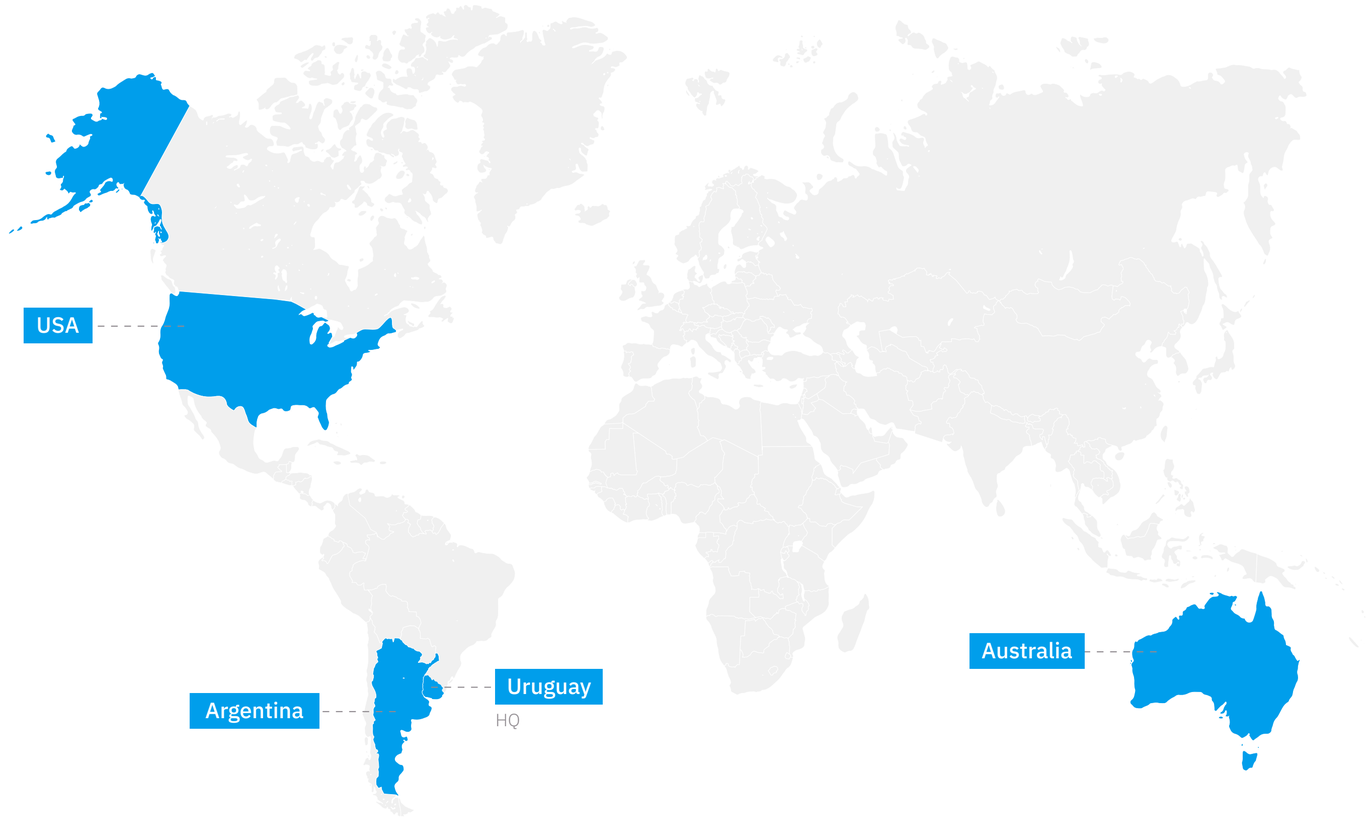

# Eolo Pharma

Biotech

## Molecular drugs to change the way chronic inflammation-related diseases are treated

Eolo Pharma uses innovative drug discovery technologies to develop a drug with the potential to be a breakthrough treatment for obesity, diabetes, non-alcoholic fatty liver disease, and other debilitating diseases.

### Eolo Pharma operational footprint




**Founded**
2017

**Stage**
Series A

**Market scope**
Global

**Employees**
>10

**Value**
>$10M

**Capital raised**
>$5M

**Founders**
- Pia Garat
- Carlos Batthyany
- Virginia Lopez
- Carlos Escande

**Investors**
SECURITAS BIOSCIENCES · FICUS · cites

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*


# Egg

Artificial Intelligence

## Using Artificial Intelligence and cooperation theory to dramatically decrease the cost of education

Egg provides personalized, online learning solutions to teach students to code, market, and design. Egg's adaptive assessments and interactive lessons create a more engaging and effective learning experience. Their goal is to improve access to quality education and promote cooperation among students, educators, and communities. So far, the company has helped educate over 100,000 students in more than 20 countries.

Egg operational footprint


| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2018 | Seed | Global | >50 | >$25M | <$5M | Ignacio Gomez Portillo<br>Carolina Pérez Mora | air capital, Draper Cygnus, embarca, Reach Capital, ALAVA VC CAPITAL |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*


# Reddot

Biotech

## Molecular diagnostics more accessible and affordable for everyone

Reddot develops and commercializes a next-generation molecular diagnostic platform designed to accurately identify genetic traces (DNA / RNA) faster, cheaper, and with the same level of accuracy as current gold standard technologies, such as RT-PCR. The company's ultimate goal is to change how we diagnose disease and to help improve patient care.

Reddot operational footprint


| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2020 | Accelerator | Global | <10 | >$10M | <$5M | Caio Real<br>Rafael M. Bottos | VESPER |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

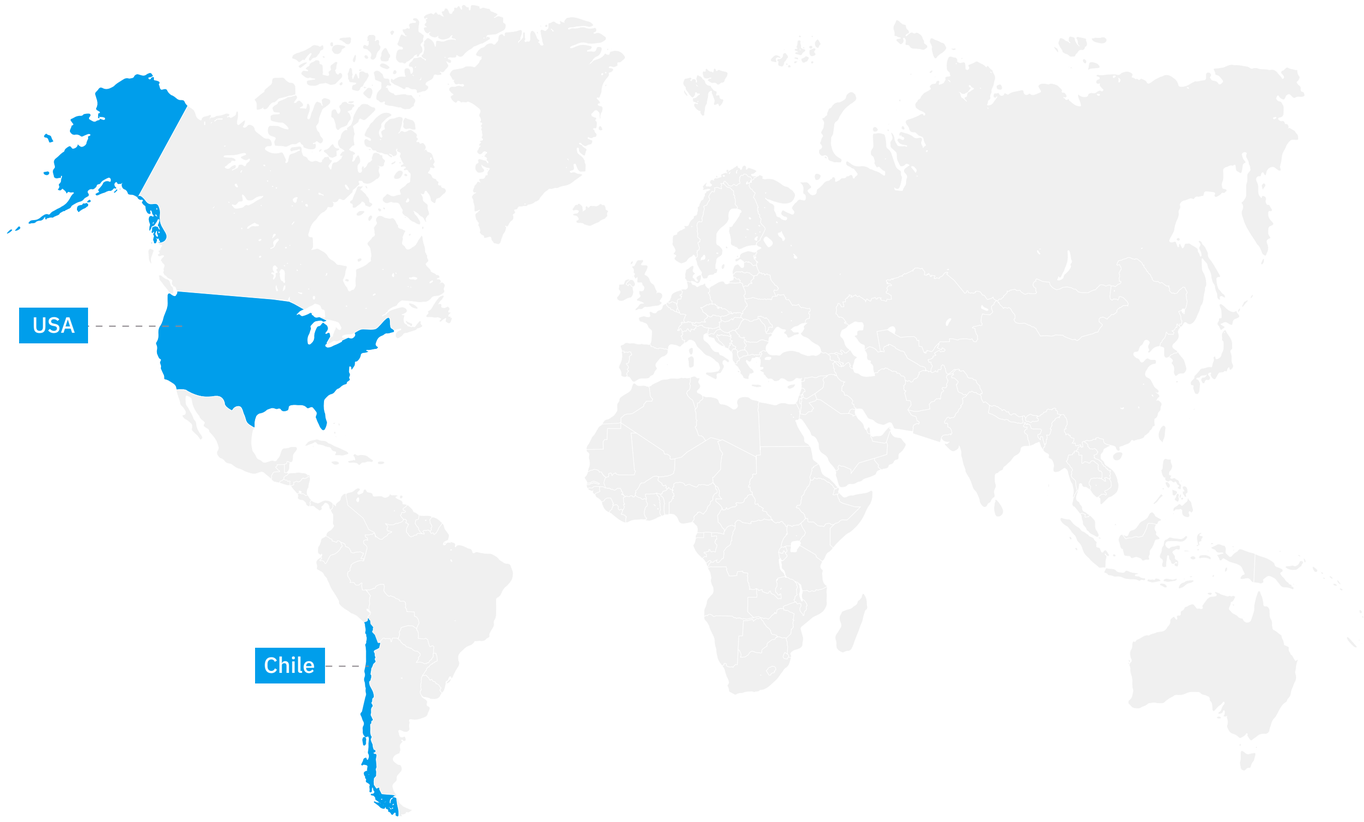

# Spora

Biotech

## Leather and other products based on mushrooms

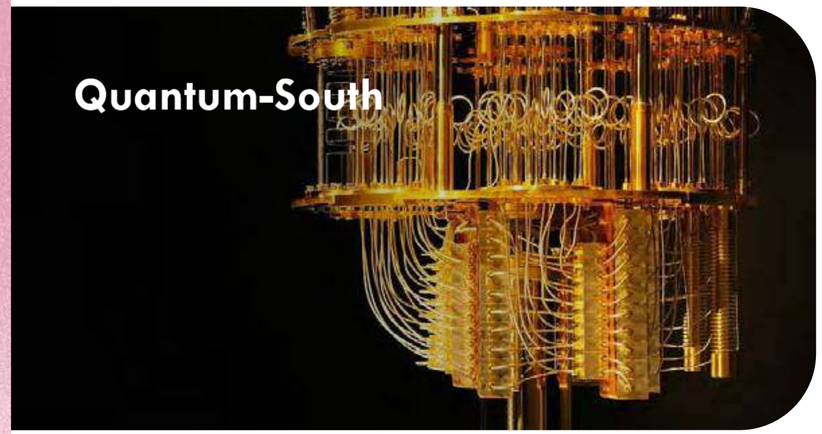
Spora Biotech is creating solutions to address climate change, animal welfare, and humanitarian issues around the world. By harnessing nature's intelligence and leveraging their expertise, they have developed Sporatex, a mushroom-mycelium-based leather that offers a sustainable alternative to animal and synthetic leather.

Spora operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2017 | Early Stage | Global | <10 | >$10M | <$5M | Hernan Rebolledo<br>Dan Miller | Fen Ventures.<br>CHILE GLOBAL VENTURES |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*



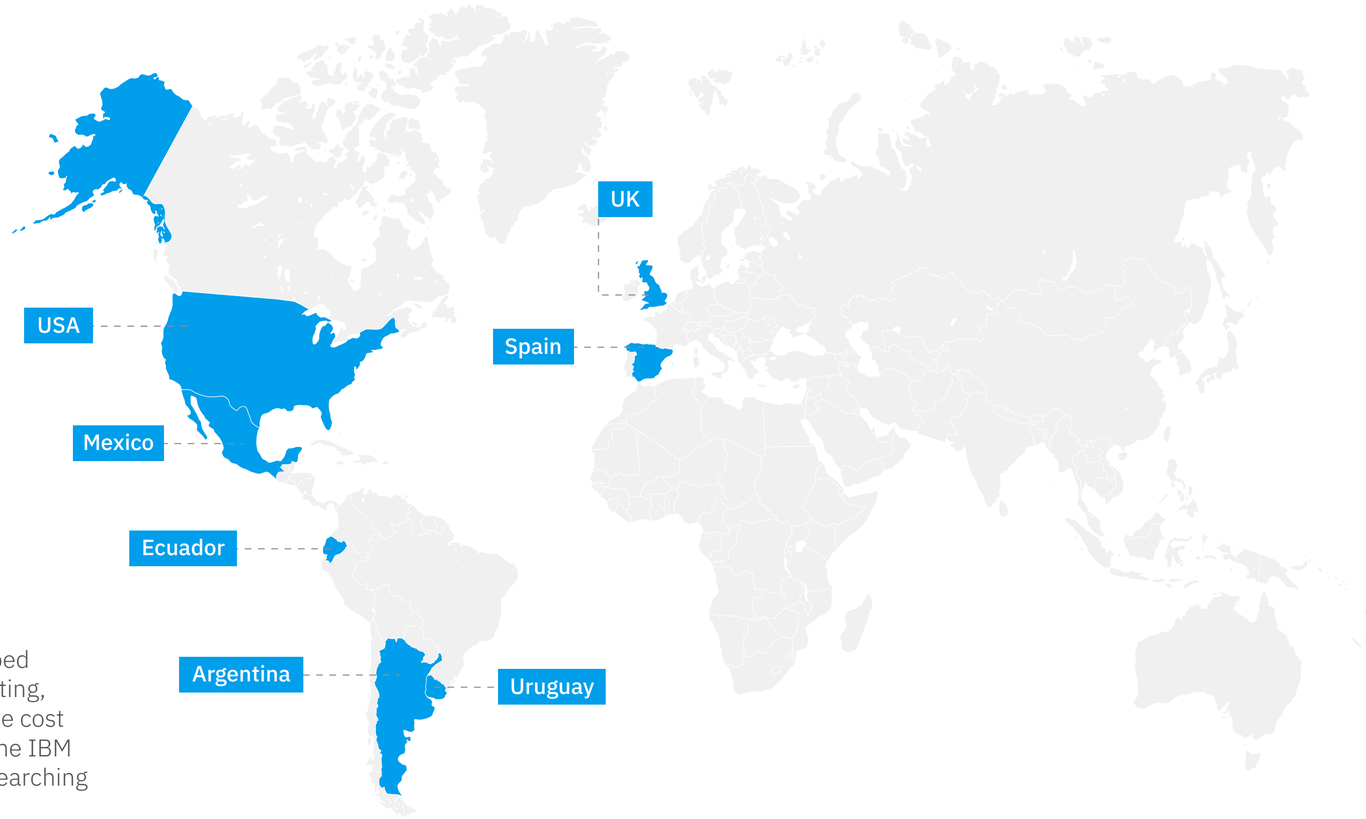

# Quantum-South

Quantum Computing

## Complex optimization leveraging quantum computing in sectors such as airlines, shipping and financial services

Quantum-South works to solve problems for air and maritime cargo that can be mapped to quantum computers. They aim to demonstrate better results with quantum computing, compared with classical systems, seeking to help companies increase revenue, reduce cost and be more efficient. The company is the first Latin American-based startup to join the IBM Quantum Network, is a member of the Microsoft Quantum Network and has been researching and working with platforms from companies like D-Wave, Rigetti, Google and Atos.

Quantum-South operational footprint




**Founded**
2019

**Stage**
Accelerator

**Market scope**
Global

**Employees**
>10

**Value**
<$10M

**Capital raised**
<$5M

**Founders**
Laura Gatti
Rafael Sotelo
Juan D. Orihuela
Martin Machin

**Key partners**
ANII Agencia Nacional de Investigación e Innovación
Starburst Accelerator
UM Universidad de Montevideo
IOT Tribe

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*

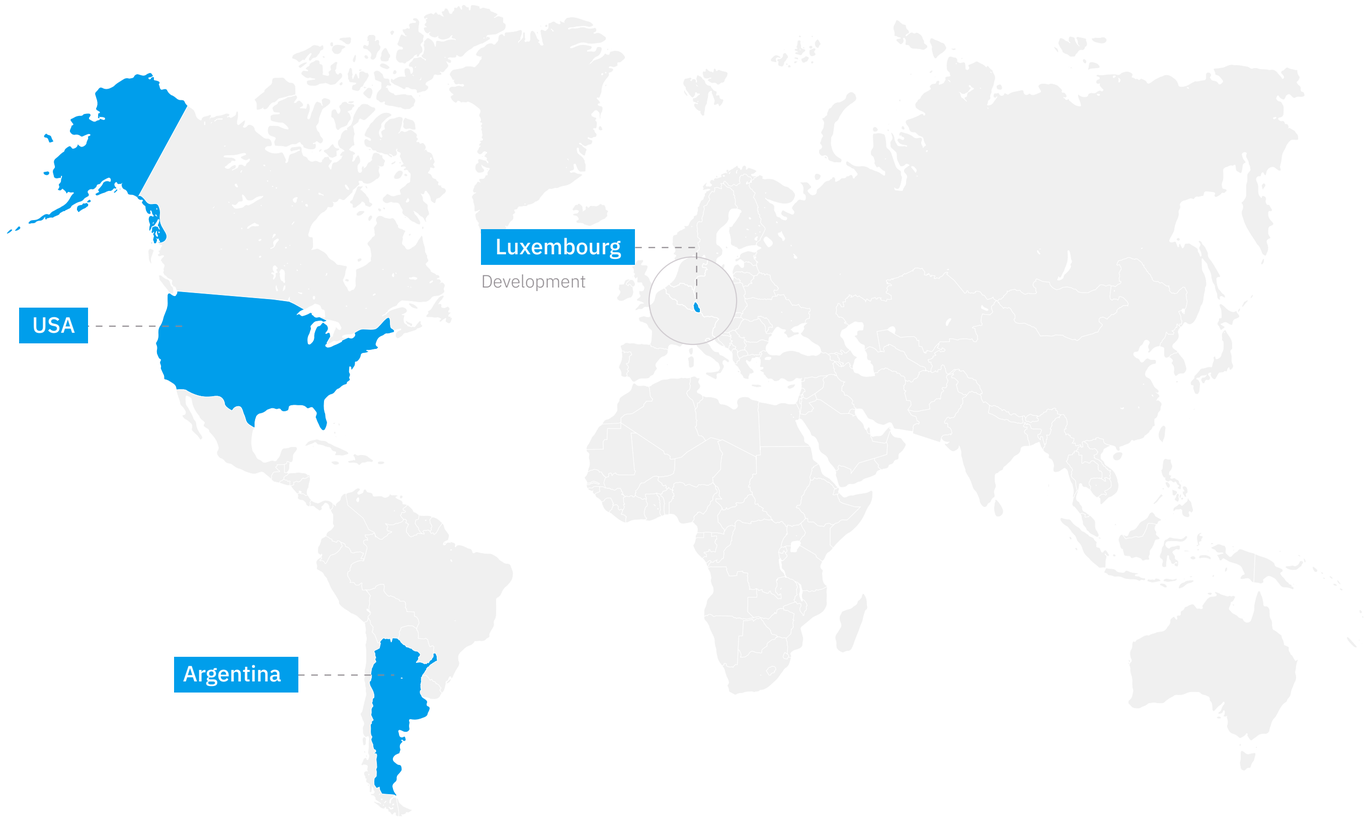

# Novo Space

Spacetech

## High-performance modular computers for satellites to drastically ease space missions

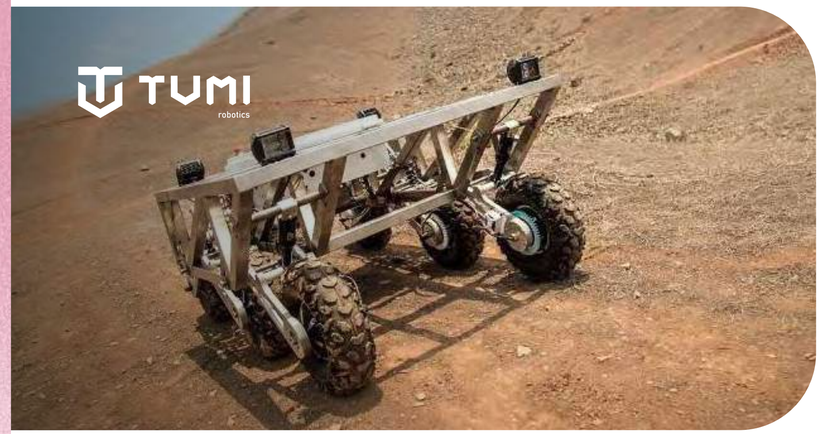
Novo Space offers products to simplify the development processes of space systems that are designed to be easy to use, reliable, and affordable. The company's products include computers, signal processors, carriers, and mass memories, which reduce time to orbit, risk, and cost and are used by start-ups and established players.

### Novo Space operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2019 | Seed | Global | >10 | >$10M | <$5M | Rodrigo Diez<br>Facundo Jorge | air capital, Draper Cygnus, techstars_, SpaceFund, SPACECADET |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*



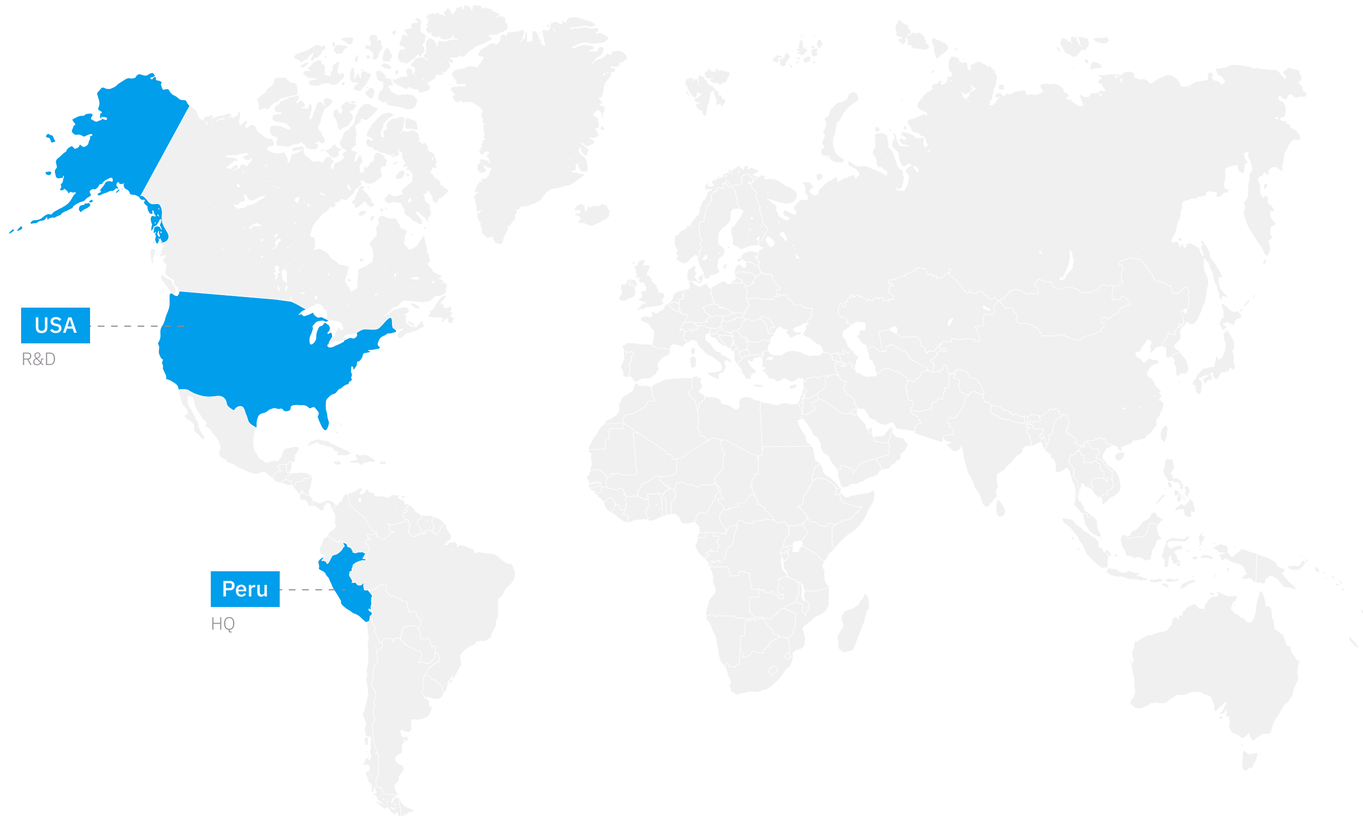

# Tumi Robotics

Robotics

## Artificial Intelligence and robotics used to explore, digitize and monitor extreme environments

Tumi Robotics is creating intelligent robots capable of performing complex tasks quickly and accurately. The company is targeting the mining, oceanography, and fishing industries, paving the way for a new era of automation with higher operational optimization, achieving greater efficiency

Tumi Robotics operational footprint




| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2016 | Pre-Seed | Global | >10 | <$5M | <$10M | Francisco Cuellar<br>Claudia Akemine | SOSV HAX |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*


# InEdita Bio

Biotech

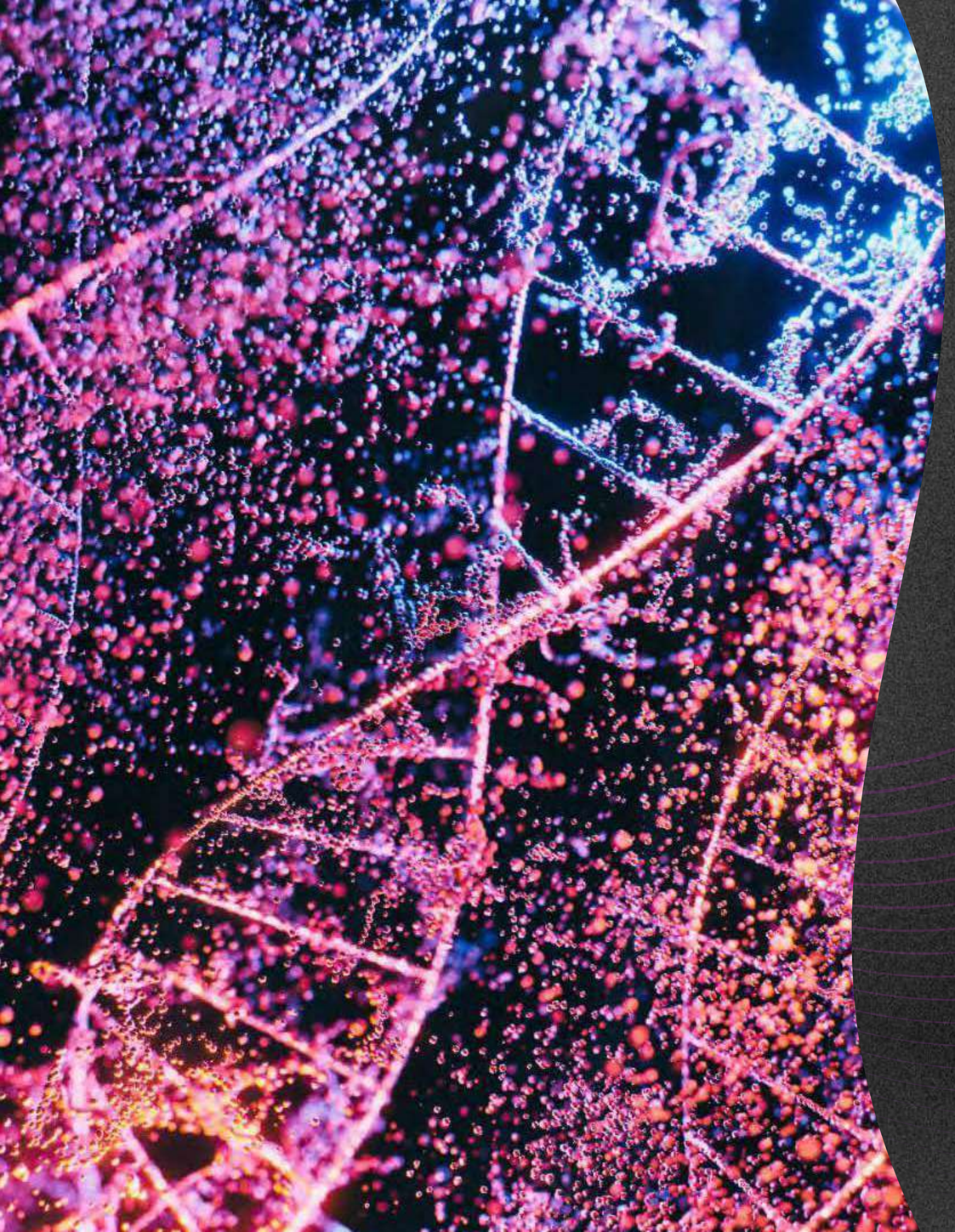
## Molecular diagnostics more accessible and affordable for everyone

Reddot develops and commercializes a next-generation molecular diagnostic platform designed to accurately identify genetic traces (DNA / RNA) faster, cheaper, and with the same level of accuracy as current gold standard technologies, such as RT-PCR. The company's ultimate goal is to change how we diagnose disease and to help improve patient care.

InEdita Bio operational footprint


| Founded | Stage | Market scope | Employees | Value | Capital raised | Founders | Investors |
|---|---|---|---|---|---|---|---|
| 2021 | Accelerator | Global | <10 | >$10M | >$5M | Paulo Arruda<br>VESPER | VESPER<br>ecoacapital |

*Sources: LinkedIn, Crunchbase, Pitchbook, Dealroom, Surfing Tsunamis analysis (see 'Terminology and methodology' Appendix)*



Appendix

# TERMINOLOGY & METHODOLOGY

# Terminology & Methodology

The term Deep Tech was coined in 2014 by Swati Chaturvedi to define a new category of startup which are built on tangible scientific discoveries or meaningful engineering innovations. They have business models based on innovations that require going deep into a technology stack, typically in frontier technologies such as artificial intelligence, biotechnology, space, nanotechnology, etc.

The vast majority of startups from Latin American and Caribbean (LAC) focus on product and business model innovation, with limited technology risk. Their biggest challenge is finding product-market fit with a profitable and scalable model. Deep Tech startups, on the other hand, focus on technology innovation, where the biggest challenge is making the technology work.

Historically, these companies required massive capital deployment over long periods, becoming the almost exclusive domain of advanced economies. However, as we as we explained in the report, these constraints have been lifted, and for the first time in history, LAC is beginning to create Deep Tech startups at scale. This allows LAC to participate in history's most radical technology revolution, enabling the region to improve lives and build a better future.

As mentioned above, the present report builds on two previous studies about Tecnolatinas (2017 and 2021). For practical purposes, these studies covered all the technology startups from the region that had raised more than a certain amount of capital ($5M and $1M, respectively). In this report, we analyze a subset of the Tecnolatinas universe and go deeper (pun intended), including all the Tecnolatinas that focused on Deep Tech and received institutional equity funding from accelerators and venture capital funds.

We understand that there is a larger universe of companies from the region that are based on science and technology, but may not necessarily be strictly doing Deep Tech innovation (for example, because they may focus on incremental innovations for import substitution) or may not have the attributes required by institutional investors. There is very limited data available about these companies, most are are highly unlikely to impact the report's conclusions meaningfully due to their limited size. In any case, we performed on dozens of interviews to identify the few players that are significant and that may not have received institutional funding because it was not available during their initial development.

For consistency purposes, we excluded from the map of the regional ecosystem companies in which most of the ownership was sold to multinational corporations, such as Auth0. While these companies signal the potential of LAC's ecosystems to create highly valuable assets, their value is tough to estimate, and today, they are more similar to any multinational company in the region. We also excluded the few Deep Tech companies from LAC that were founded before the year 2000, like Embraer because, although valuable and relevant, they were created in a very different context.

Some startups included in the map are already global corporations whose founders live outside the region, like Satellogic. To determine whether a company was from LAC, they had to meet two criteria: the bulk of their R&D

should be done in LAC, and the founders must have strong ties to the region.

To map the regional ecosystem, we used two complementary approaches. The first was a top-down approach that consisted of identifying startups from databases such as Pitchbook, Crunchbase, Dealroom and LAVCA. The second was a bottom-up approach that consisted of mapping all the startups that compose the portfolios of the Deep Tech venture capital funds and accelerators from the region.

We began by creating a consolidated list of companies. This list then underwent a rigorous process of curation, validation and startup profile augmentation. During this process, we individually analyzed thousands of startups and removed those that did not fit our scope of study. Following this, we carefully reviewed all the remaining companies and corrected any conflicting information we found, using alternative sources for verification. To augment the profiles of these startups, we supplemented the existing information to create robust profiles for each company. This involved drawing from a variety of sources, including hundreds of articles, reports, press releases, and company websites. Each profile includes variables such as name, sector, year funded, founders, investors, headquarters, markets of operations, capital raised, the value of the last round, estimated valuation, number of employees, webpage, etc.

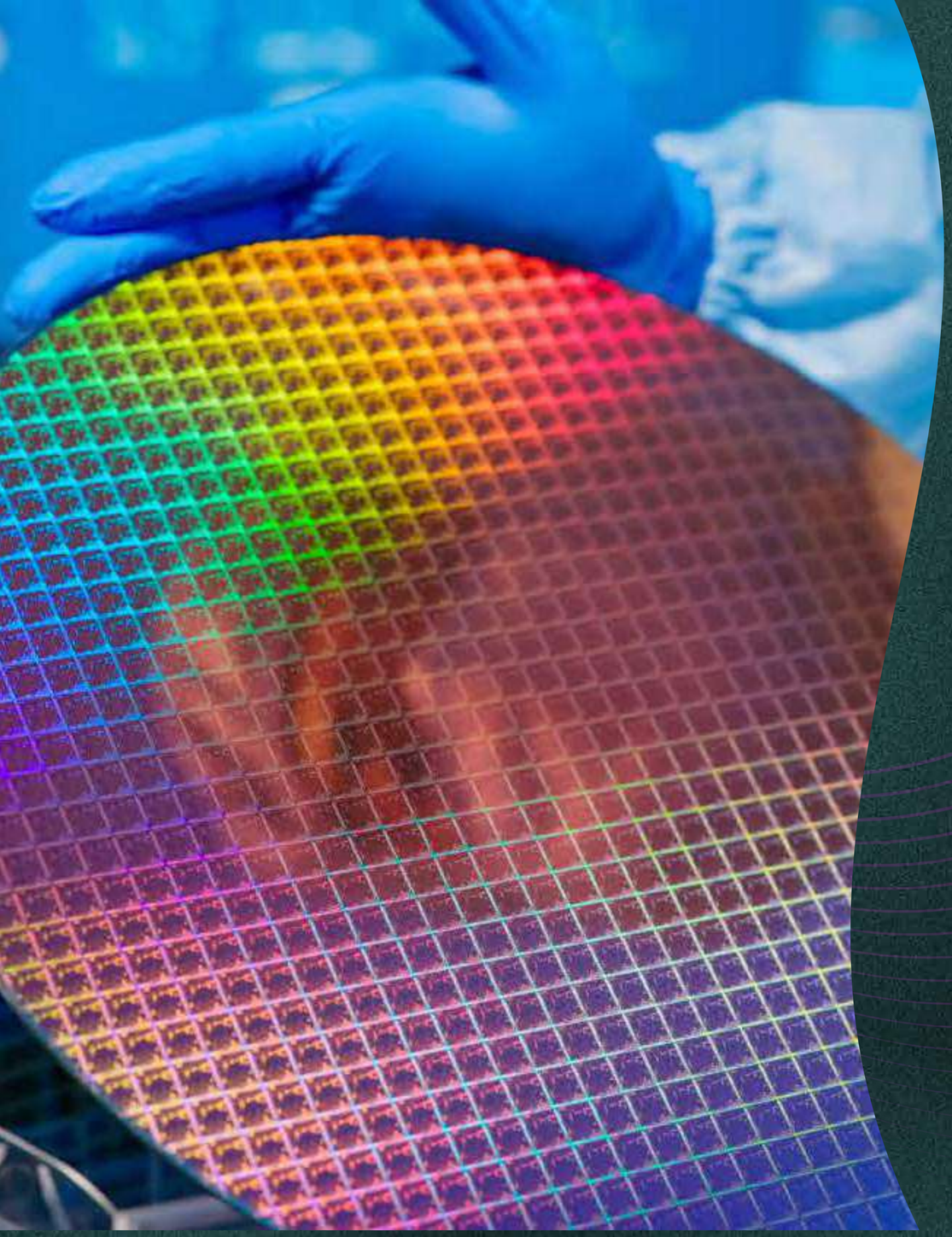
The value of publicly listed companies is based on the market capitalization as of May 1st, 2023. We used the last disclosed valuation for unlisted companies with a publicly disclosed value. To estimate the value of unlisted companies, we used a multiple of six times the last financing round. We added the estimated value of all the startups in our database to estimate the value of the entire region's ecosystem and each country and sector, designating as Ecosystem Value the sum of the value of the Deep Tech startups in that particular ecosystem.

This enabled us to make a series of comparisons across time and geographies and identify the more successful strategies in the region. When we refer to value creation in relation to startups, we refer to an increase in the value of the companies.

Based on this information, we proceeded to perform over dozens of analyses, complementing the information of the database with further reports and industry data to obtain the insights included in the study.

Some venture capital funds and accelerators focused on Deep Tech startups in the region feature some companies that fall outside our definition. To achieve greater accuracy, we mapped their entire portfolios, analyzed each of those companies, and filtered the startups that were either not strictly Deep Tech or were not from LAC.

The report was developed with the support of powerful AI tools, such as GPT-4, particularly for text review and improvement, as well as translation support.



Appendix

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