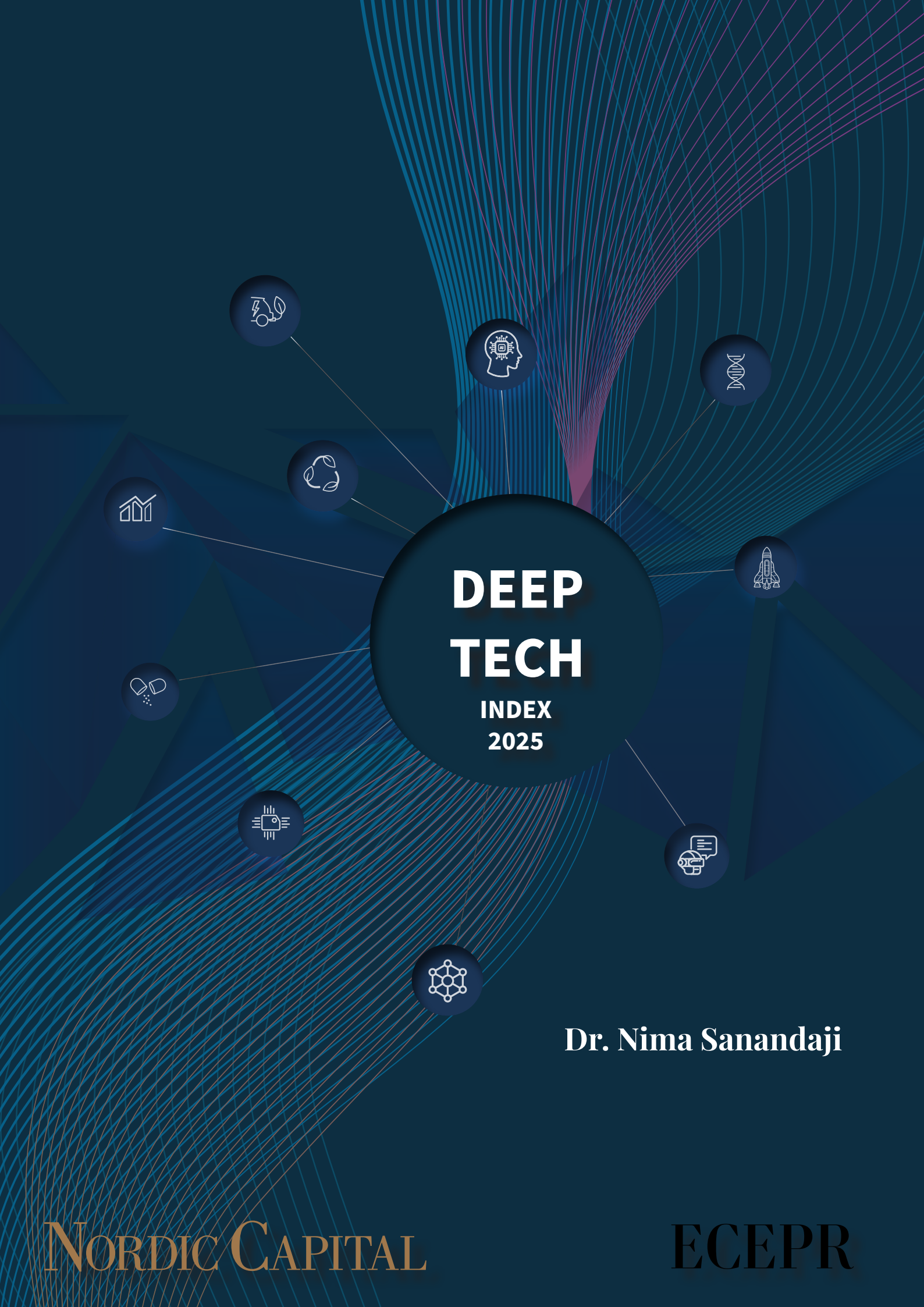

Dr. Nima Sanandaji

NORDIC CAPITAL

ECEPR

DEEP TECH INDEX 2025

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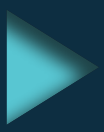
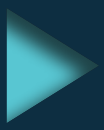
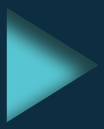
Summary



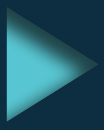
Europe has a growing share of the world-leading deep tech companies, with strengths in clean energy, clean tech, photonic & electronic, quantum & computing as well as in fintech.



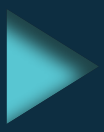
The large majority of leading deep tech companies are found in North America, with particular dominance in artificial intelligence, biotechnology, robotic & communication, quantum & computing and pharmaceuticals.



Santa Clara Valley remains the world's leading deep tech cluster. Boston overtakes New York which now ranks third. London also climbs and is now ranked fourth, overtaking Los Angeles on fifth place.



Asia's leading deep tech hubs are New Delhi, Mumbai and Singapore. India has five urban regions with multiple world-leading deep tech companies. Asia has strengths in clean energy, photonic & electronic, pharmaceuticals and space & advanced materials.



Africa has strength in clean tech. Nairobi in Kenya, Lagos in Nigeria and Sydney in Australia are important deep tech hubs outside of the top three leading continents.

The **Deep Tech Index** analyses where the leading companies involved in development and marketing of deep technologies are located. We live in a time of unprecedented technological change, at which significant advances are recorded in areas such as Artificial Intelligence (AI), Clean Energy, Clean Tech, Biotechnology, Photonic & Electronic, Robotics & Communication, Quantum & Computing, Pharmaceuticals, Fintech, as well as Space & Advanced Materials. By using Crunchbase, a leading international enterprise database, the study analyses the leading 50 companies in each field. The result is a database on the leading 500 Deep Tech companies globally. This index outlines both where this innovation is taking place and how it differs between various technology areas. The result is a unique map of technological progress:

- About 67 per cent of leading Deep Tech companies are based in North America. While most are found in the US, Canada also houses a significant share. The North American dominance is reduced compared to last year, as the share has fallen from 72 percent. North America has particular strengths in the deep tech areas artificial intelligence, biotechnology, robotic & communication, quantum & computing and pharmaceuticals. Four out of the top globally leading deep tech regions, namely Santa Clara Valley, Boston, New York and Lost Angeles, are found in the USA.

- Europe´s share of globally leading deep tech companies rises to nearly 19 percent, up from below 14 last year. Europe has particular strengths in clean energy, clean tech, photonic & electronic, quantum & computing as well as in fintech. Noteworthy European deep tech hubs include London, Zurich, Eindhoven, Stockholm and Cambridge.

- Santa Clara Valley is the leading deep tech hub globally. The share of the top 500 world-leading companies that are located in this region has however fallen from 24 percent last year to 20.4 percent, representing a normalization from very strong global reliance on a single innovation region. It is followed by Boston (6,4% of top 500 global deep tech companies), New York (6,0%), London (4,6%) and Los Angeles (3.8%). Compare to last year's ranking New York and London each climb one step, while New York and Los Angeles drop one position each. Outside the USA, the leading hubs include New Delhi (2.0%), Vancouver (2.0%), Mumbai (1.4%), Singapore (1.4%), Toronto (1.2%), Zurich (1.2%), Eindhoven (1.0%) and Tel Aviv (1.0%).

- Asia´s share rises from 11 to 11.4 percent of the world´s leading deep tech companies, while that of the rest of the world declines by as much. Asia has strengths in the deep tech areas of clean energy, photonic & electronic, pharmaceuticals and space & advanced materials. The continents leading deep tech hubs are New

Delhi, Mumbai and Singapore. India has five urban regions with multiple world-leading deep tech companies. Compared to last year, he world´s leading deep tech companies are even more focused to the three leading continents. Africa has 1.4 percent of the world-leading deep tech companies, compared to 0.6 percent in Latin America and Oceania respectively.

- Deep tech is gradually spreading internationally. Last year, 44.4 percent of all the world´s leading deep tech companies were found in the top 5 regions, now this share is reduced to 41.2 percent. Last year 84.6 percent of the world-leading deep tech companies were in regions with multiple world-leading deep tech companies, while the remaining were in regions with a sole deep tech company. This year the share of world-leading deep tech companies in regions which host at least another world-leading deep tech company has fallen to 77.8 percent. This represents a gradual global diversification of technology centers.

- The highest share of deep tech companies per million adults is found in Luxembourg (2.17 top 500 global deep tech companies per million adults), followed by Singapore (1.64), Switzerland (1.56), the USA (1.42), Israel (1.20), Finland (1.17), Canada (1.07), the Netherlands (0.79), the UK (0.79), the UAE (0.63) and Sweden (0.61).

- Having more leading deep tech companies per capita, is linked to lower unemployment – particularly for the youth. Being on top of technological innovation allows for the creation of export-oriented jobs. Stimulating deep tech is thus a powerful tool to boost technological progress, prosperity, and jobs growth. Every additional globally leading deep tech company per million adults corresponds to a 0.46 percentage point decrease in total unemployment. For the youth the effect is nearly double as strong, as each additional - and 0,78 percentage decrease in youth unemployment.

- To boost deep tech, nations should promote school results, foster top engineering & technology universities, lower taxes on profits and capital gains, and strengthen property rights. These factors are linked to having a higher share of world-leading deep tech companies per million adults. Countries with many world-leading deep tech companies tend to invest more abroad, and additionally have higher share of high-tech exports.

Preface: Klas Tikkanen

Nordic Capital encourages academic research and has proudly supported the European Centre for Entrepreneurship and Policy Reform (ECEPR) since 2017. Our involvement in the Brain Business Jobs Index and the Superentrepreneurs Indexes has allowed us to examine and decode the geography of Europe's knowledge-intensive jobs. Since 2023, our attention also encompasses the geography of technological innovation.

Technological advancement has been a key driver for human progression since the inception of civilisation. Although change is a constant throughout history, the current pace and breadth of development is unprecedented. Innovations within AI, fintech, advanced materials, and biotech are revolutionising our societies and affecting our day-to-day lives. These transformative dynamics form the foundation of this study.

Studying DeepTech innovation globally is crucial for many reasons. Not only does it offer a valuable metric for discerning key societal determinants and trajectories, but it also earmarks nations set for future reward. The study reveals a correlation between efficient educational systems, low taxation, robust property rights, and the prevalence of leading tech companies. This is intrinsically tied to economic growth and low unemployment rates.

By looking at the world's leading companies, this index follows the development of innovation globally. Last year, about 44 per cent of all the world's leading DeepTech companies were based in five regions. Slowly, the rest of the world is catching up, with their share falling to 41 percent. This year, Europe is catching up while Asia makes small progress. North America remains dominant, but their share is on the decline.

Today's landscape is by no means a given – it is both plausible and rather likely that other regions will continue to bridge the massive technology gap that North America has. A glimpse into the future can perhaps be inferred from by looking at where the top engineering and technology universities are located. Out of the top 100, 27 are found in North America, 31 in Europe and 32 in Asia.

Europe's positive momentum may very well be a temporary variation, but it can also represent a more lasting shift. For Europe to build upon its impressive strengths, it will be necessary to implement policies that genuinely foster and value knowledge and growth, underpinned by a readiness to evolve and invest in these sectors.

For North America, the challenge remains to retain its strong world position. India is the clear leader in Asia, with five regions having a few or more globally leading DeepTech companies. China has massive potential for future progress.

The future is not written, it remains to be seen how today's trends develop. Cultivating an environment that fosters the creation of such companies is tantamount to laying the groundwork for future economic progress. We hope that this index will bring with it a better understanding of the shifting sands of the technology landscape around the world.

Klas Tikkanen, COO at Nordic Capital Advisors, has led the firm's transformation in the past decade, including the development of its strategy, governance, culture, and operations. As part of the management team, he serves on the Investment Review Committee, the Portfolio Review Committee, the Fair Value Committee, Operations Advisory Board, and the Value Portfolio Committee. Prior, Klas spent six years at McKinsey & Company as a Management Consultant and held several senior management functions, mostly as a CFO in PE- or bank-owned portfolio companies. Having throughout his career worked almost exclusively with turnarounds and complex carve-outs, Klas brought extensive experience from transforming and building high-performing organizations. He holds an MSc in Business Administration and Economics from Stockholm School of Economics.

Deep Tech Index

This index analyses where the leading companies involved in development and marketing of deep technologies are located. The study focuses on the following fields of deep tech development: Artificial Intelligence; Clean Energy; Clean Tech; Biotechnology; Photonic & Electronic; Robotic & Communication; Quantum & Computing; Pharmaceuticals; Fintech; Space & Advanced Materials.

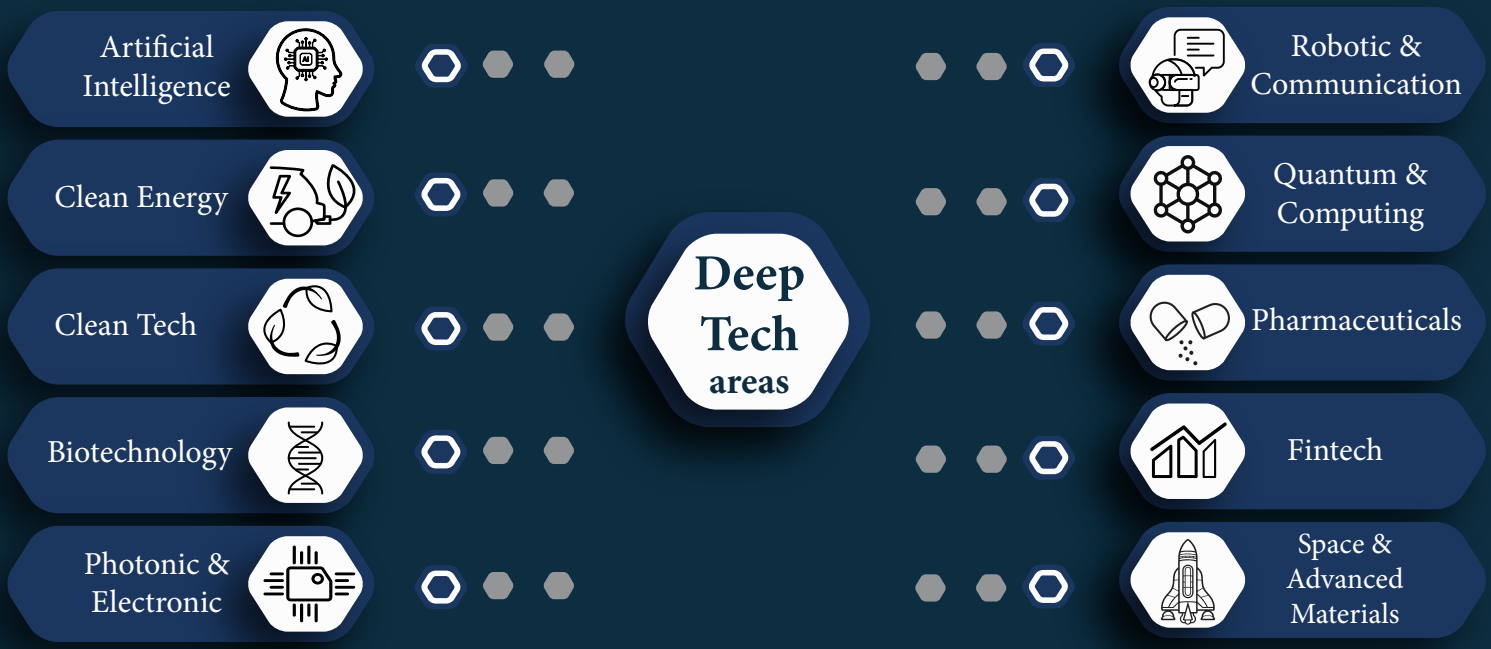
By using Crunchbase, a leading international enterprise database, the location of the leading 50 companies in each field is analyzed. The result is a database on the 500 leading deep tech companies of the world. While Crunchbase is created mainly as a tool for investors and entrepreneurs, it has also gained considerable academic interest in recent years. For example, Jean-Michel Dalle, Matthijs den Besten, and Carlo Menoni published a study in 2017 for the OECD on the possibility to use Crunchbase for research in economics and management. The authors noted that Crunchbase is attracting interest from researchers in different fields since it contains unique data on the start-up eco-system.[1] Yuxian Eugene Liang and Soe-Tsyr Daphne Yuan have relied on Crunchbase for studying firm investments, with the motivation that Crunchbase is the largest global database with profiles for the included companies.[2] Ross Brown and Augusto Rocha have used the database in order to study the actions of investors during the uncertainty created by the COVID-19 pandemic.[3]

This unique index makes it possible to map out where the advanced tech development of the world is occurring, and how this differs for each area of technology. This results in a mapping of technological progress around the world.

1 Dalle, Den Besten & Menon (2017).

2 Liang & Yuan (2016).

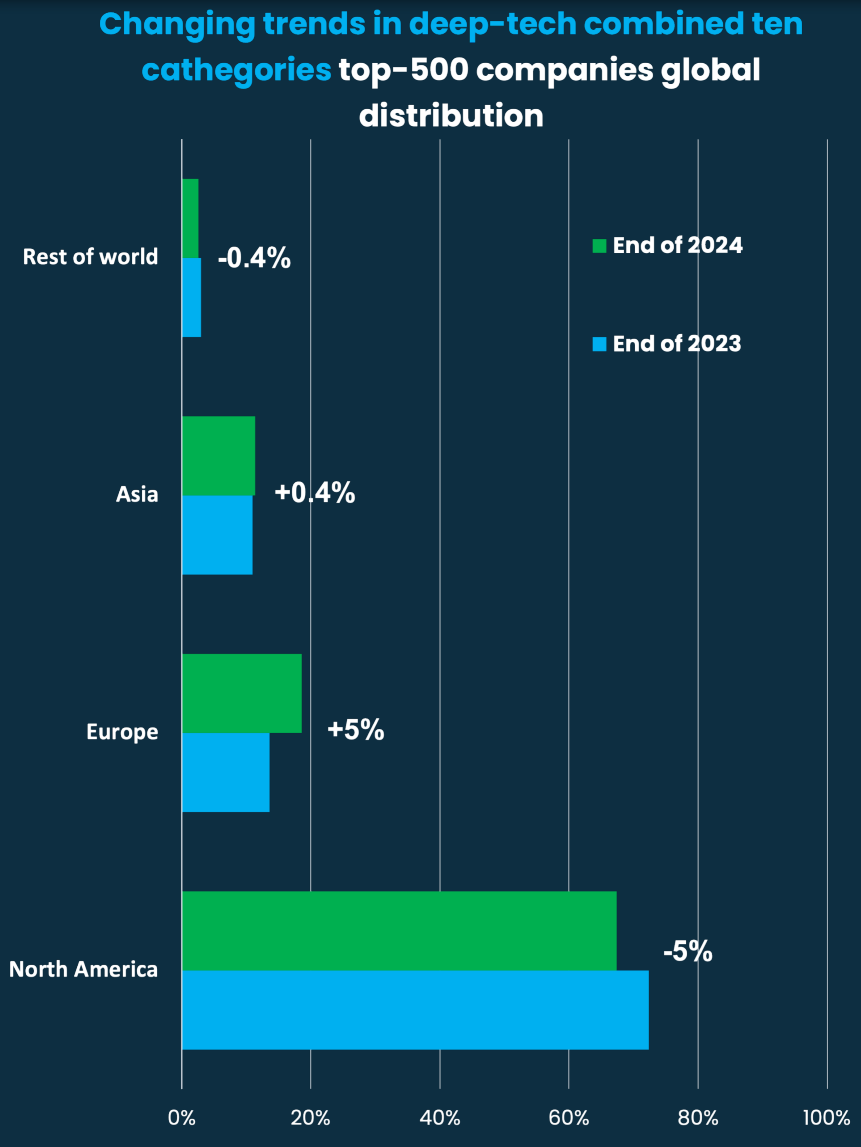
3 Brown & Rocha (2020).


Artificial Intelligence
Clean Energy
Clean Tech
Biotechnology
Photonic & Electronic
Deep Tech areas
Robotic & Communication
Quantum & Computing
Pharmaceuticals
Fintech
Space & Advanced Materials

Europe surges in deep tech

A key trend compared to last year is that the share of globally leading deep tech companies in Europe increases significantly. The share of world-leading deep tech companies in Europe rises to 18.6 percent in this year's index, a significant improvement from 13.6 percent last year. At the same time that Europe's share increases by 5 percent, the same decrease is visible in North America where the share is 67.4 percent, down from 72.4 percent last year. In Asia the share increases to 11.4 percent, up from 11. A corresponding reduction of 0.4 percent is found in the rest of the world, which goes from having 3 to 2.6 percent of the world-leading deep tech companies.

European countries with growth in share of world-leading deep tech companies include Luxembourg, Switzerland, Norway and Spain. It remains to be seen if Europe can maintain this growth in share of world-leading deep tech companies, or if the current economic worries in Germany and other large European economies will lead to an again widening gap to North America.



On a global level, the dominance of USA in deep tech is so significant, that it dwarfs any other single nation. The USA has fully 62 percent of all globally leading deep-tech companies, followed by the UK (7%), Canada (6%) and India (5%). Germany, the Netherlands and Switzerland have each a couple of percentage additionally of the world-leading deep tech companies.

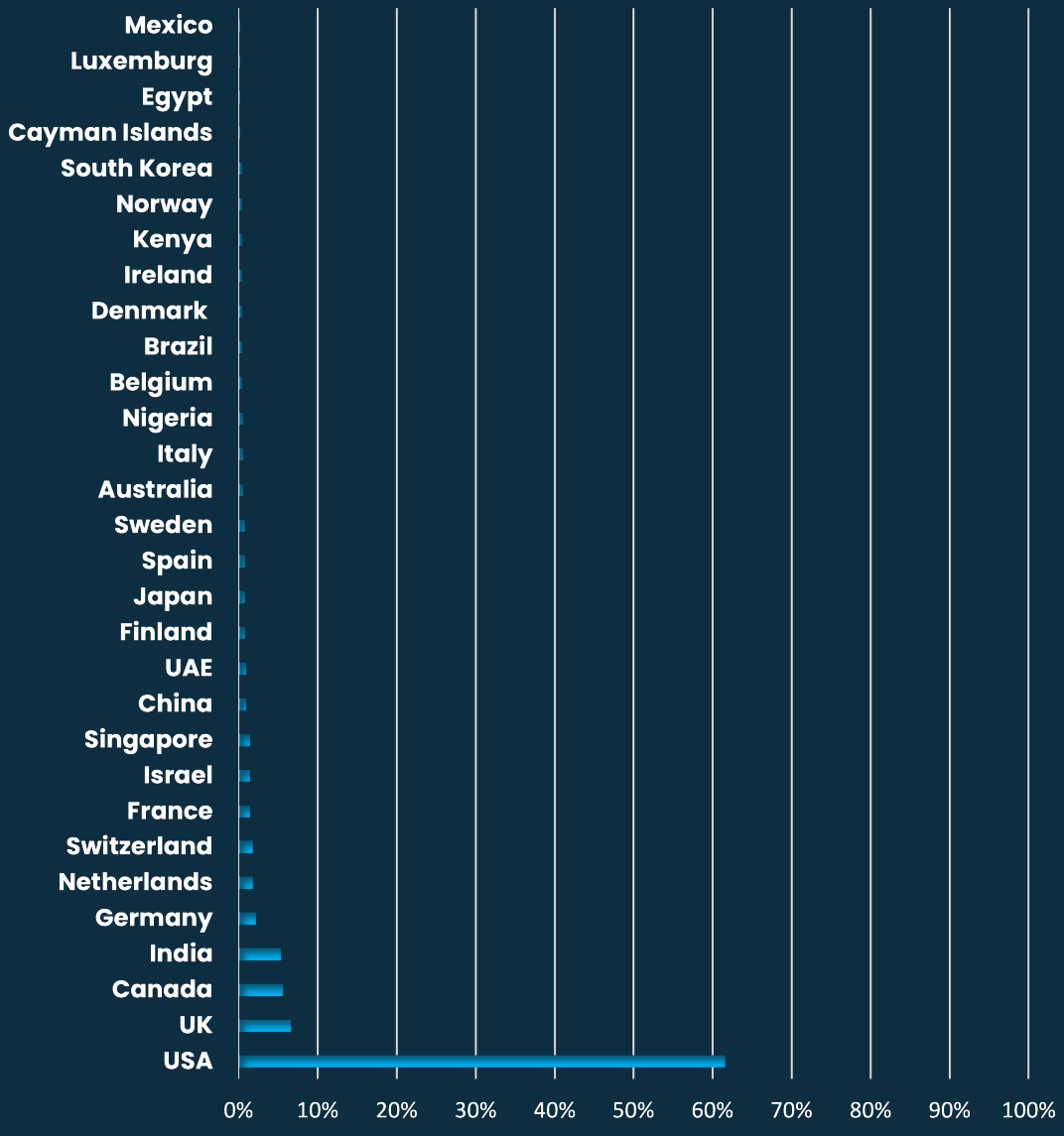
> **London is the leading European hub of deep tech development, with 4.6 percent of all globally leading deep tech companies situated in this European center for business and innovation. Paris, Amsterdam, Berlin, Stockholm, and Dublin are other leading European deep tech centers.**

Clean Tech (Europe & Africa focused)	
North America	40%
Europe	34%
Asia	12%
Rest of world	14%

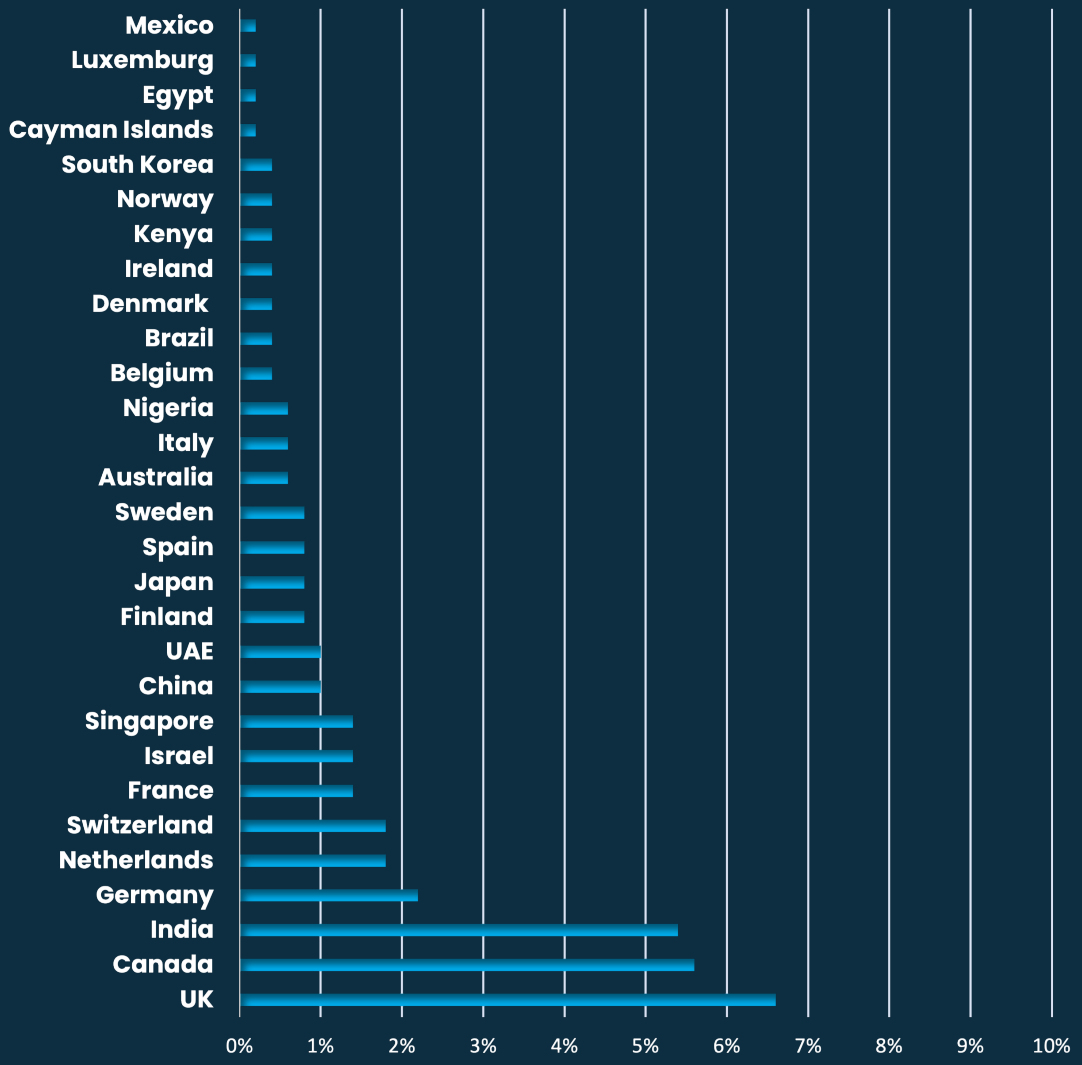
Fintech (Europe focused)	
North America	58%
Europe	28%
Asia	12%
Rest of world	2%

Quantum & Computing (North America & Europe focused)	
North America	74%
Europe	20%
Asia	4%
Rest of world	2%

Deep-tech combined ten cathegories top-500 companies global distribution, end of 2024



Deep-tech combined ten cathegories (excluding the USA) top-500 companies global distribution, end of 2024



North America: Santa Clara Valley, Boston and New York remain dominant but the world edges closer

North America has particularly strong dominance in the areas of artificial intelligence, biotechnology, robotic & communication, quantum & computing and pharmaceuticals. In these five fields of deep tech, around four out of five of the world-leading deep tech companies are found in North America.

Santa Clara Valley is the dominant tech capital of the world, with one fifth of all world-leading companies of the world located here. It is a leading center of biotechnology, as is New York. In pharmaceutical development, Boston is leading, followed by San Diego and Santa Clara Valley on third place. Artificial intelligence development is centered on Santa Clara Valley, followed by New York and Seattle.

Santa Clara Valley, Los Angeles, Austin and Chicago are the leading robotic & communication tech regions. Santa Clara Valley, Boston as well as Vancouver in Canada are centers for quantum and computing development.

The share of global deep tech companies in North America has fallen by 5 percentage points since last year, representing a normalization. Particularly the USA but also Canada remain dominant, but competition is on the rise.

Biotechnology (North America focused)	
North America	84%
Europe	14%
Asia	2%
Rest of world	0%

Artificial Intelligence (North America focused)	
North America	80%
Europe	10%
Asia	10%
Rest of world	0%

Robotic & Communication (North America focused)	
North America	76%
Europe	16%
Asia	6%
Rest of world	2%

Santa Clara Valley is the dominant tech capital of the world, with one fifth of all world-leading companies of the world located here.

Asian deep tech is dominated by India, strengths include space and photonics

A relative strength of Asia is in the field of space & advanced materials, as fully 20 percent of the leading developers in this deep tech field are found in Asia. Also, in photonic & electronic nearly one out of five world-leading deep tech companies are found in Asia.

Clean energy and pharmaceuticals, with 16 and 14 percent of the world-leading deep tech companies currently in Asia, are other relative strengths.

Asia's leading deep tech hubs are New Delhi, Mumbai and Singapore. India has five urban regions with multiple world-leading deep tech companies, including besides New Delhi and Mumbai also Bengaluru, Chennai and Hyderabad.

In terms of deep tech India is far ahead of China. In the coming years, it is likely that an increasingly large share of the globally leading deep tech companies of the world will evolve in Asia, as particularly China amasses the investments needed to achieve this.

Space & Advanced Materials (Asia focused)	
North America	68%
Europe	12%
Asia	20%
Rest of world	0%

Photonic & Electronic (Asia & Europe focused)	
North America	56%
Europe	24%
Asia	18%
Rest of world	2%

Clean Energy (Europe & Asia focused)	
North America	58%
Europe	22%
Asia	16%
Rest of world	4%

Pharmaceuticals (North America & Asia focused)	
North America	80%
Europe	6%
Asia	14%
Rest of world	0%

> Asia's leading deep tech hubs are New Delhi, Mumbai and Singapore. India has five urban regions with multiple world-leading deep tech companies, including besides New Delhi and Mumbai also Bengaluru, Chennai and Hyderabad.

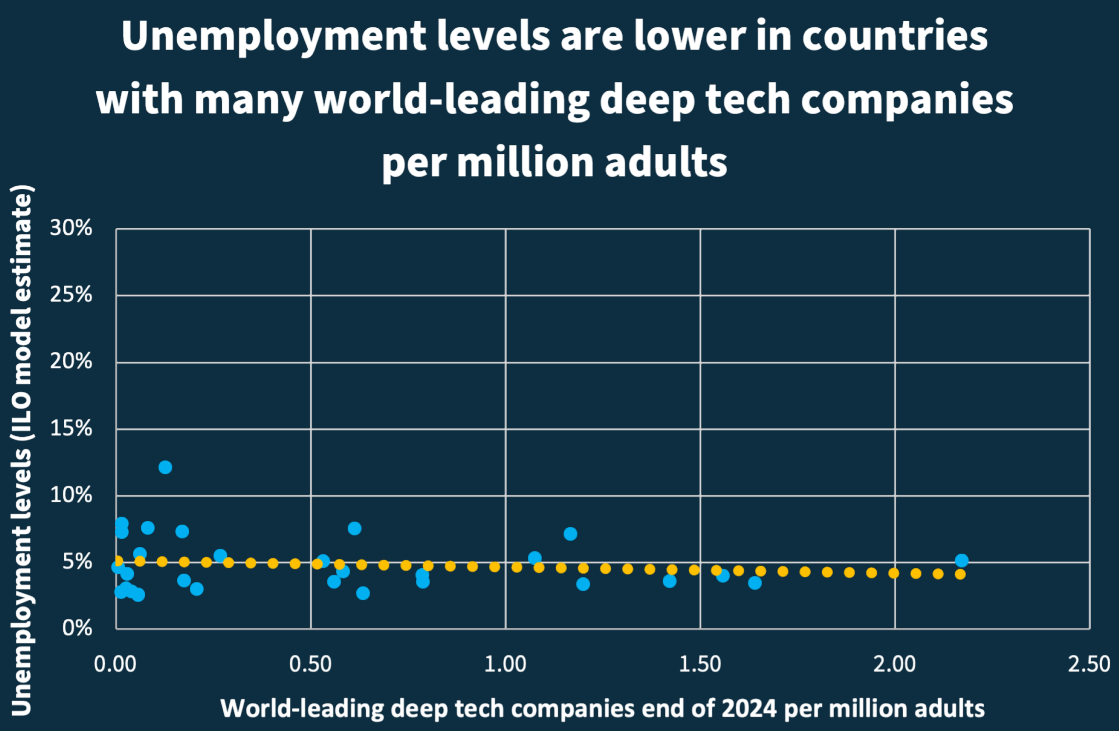
Youth benefit twice as much from the job creation effect of deep tech companies

Much of global economic development is currently linked to technological progress. Deep tech companies are already today playing a key role in the economy and are further developing those technologies that will be market dominating in the coming generation. Companies high up in the business hierarchy tend to play an important role in attracting investments, stimulating exports, and job growth. While technologically advanced companies themselves do offer job opportunities, they also foster employment indirectly, through subcontractors, and by stimulating the local service economy. Deep tech companies often sell their products and technologies to other companies in the same country, and thus promote the technological advancement of the overall economy.

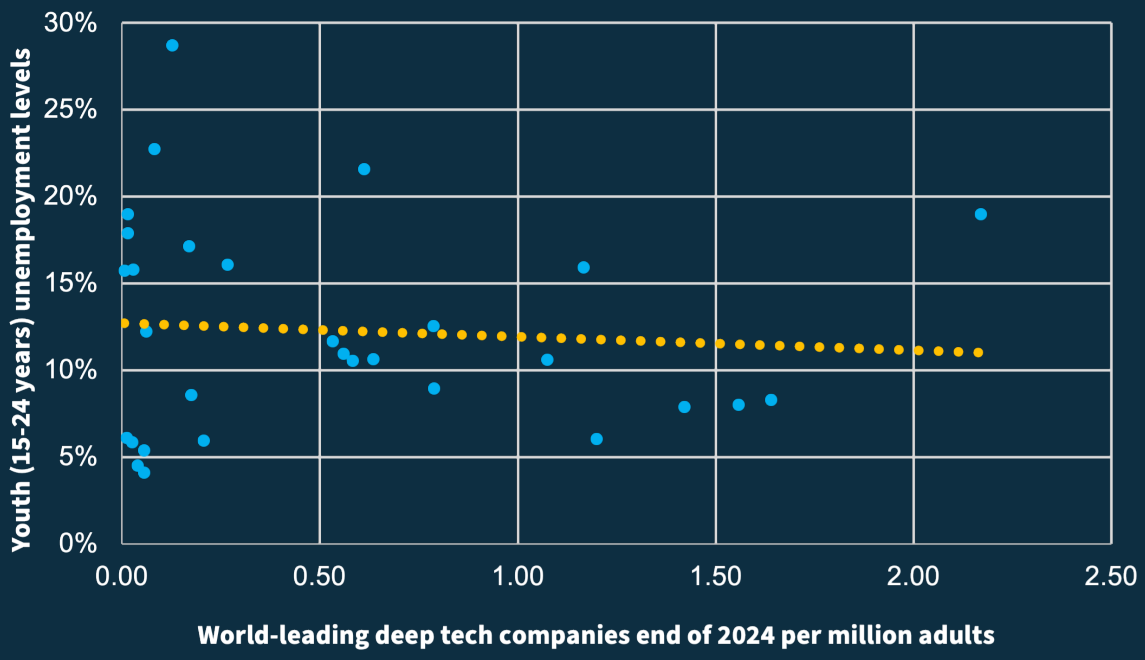
These factors can explain why those countries that have more world-leading deep tech companies per million adults, also tend to have lower unemployment. One globally leading deep tech company more per million adults, is linked to 0.46 percentage points lower unemployment. This is the finding of a regression analysis of the countries in the world which host at least one globally dominant deep tech company.

In a world driven by technological change, being on top of technological development allows for export-oriented jobs to grow, which in turn stimulates other forms of job growth in the local market, as demand is driven up. Stimulating deep tech is advantageous for national governments, in order to boost the technological progress of their respective countries, to further prosperity, but also to foster jobs growth. The link for the youth is even stronger, as one globally leading deep tech company more per million adults, is linked to 0.78 percentage points lower unemployment. In particular the labor outcome of youth, which struggle more to enter labor markets, are linked to deep tech success. Those countries that are on top of technological progress, are best suited to offer the young generation good conditions on the labor market.

Those countries that are on top of technological progress, are best suited to offer the young generation good conditions on the labor market.



Youth unemployment in particular is lower in countries with many world-leading deep tech companies

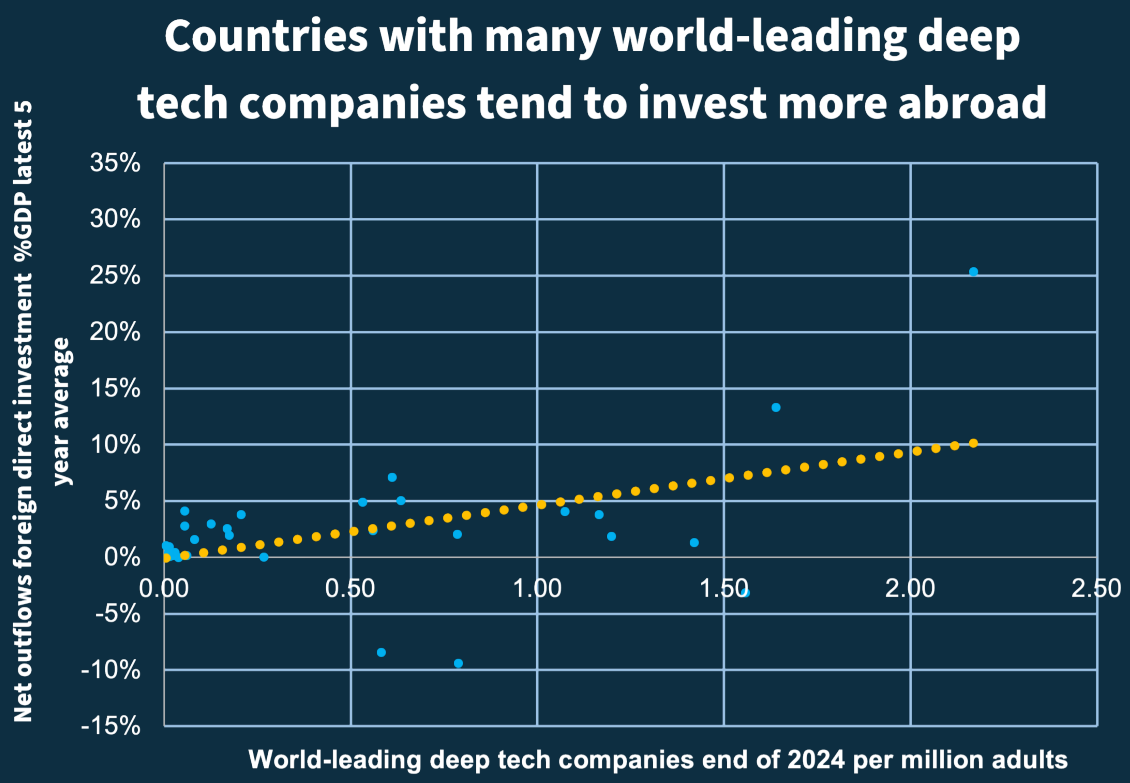


Leading deep tech countries invest internationally and have high share of technology exports

Two important economic characteristics of countries with success in deep tech relates to exports and international investments. Firstly, those countries that have a higher share of world-leading deep tech companies per million adults tend also to have a higher share of high-tech goods amongst their goods exports. While there is variation, often those countries which succeed in deep tech are benefiting from being able to rely more on goods exports that are high up in the value chain, a typical characteristic of high-tech goods.

This enables higher value production per employee, resulting in higher prosperity per capita. Additionally, more jobs high up on the value chain are created, which create ripple effects via indirect job creation.

Those countries that have a higher share of world-leading deep tech companies per million adults also tend to invest more internationally, as they typically have a higher share of gross domestic product (GDP) in net outflow of foreign direct investments. This is again not the only determinant factor, other characteristics also set countries apart, but generally speaking those countries that are succeeding in deep tech tend to be net investors in other parts of the world. One reason is that world-leading deep tech companies often invest internationally through their expansion progress. Another is that nations with deep tech success are on top of the global value chain and therefore have the funds for international investment.


Countries with many world-leading deep tech companies tend to invest more abroad
Net outflows foreign direct investment %GDP latest 5 year average
35%
30%
25%
20%
15%
10%
5%
0%
-5%
-10%
-15%
0.00
0.50
1.00
1.50
2.00
2.50
World-leading deep tech companies end of 2024 per million adults

Top schools and top universities are the recipe for deep tech progress

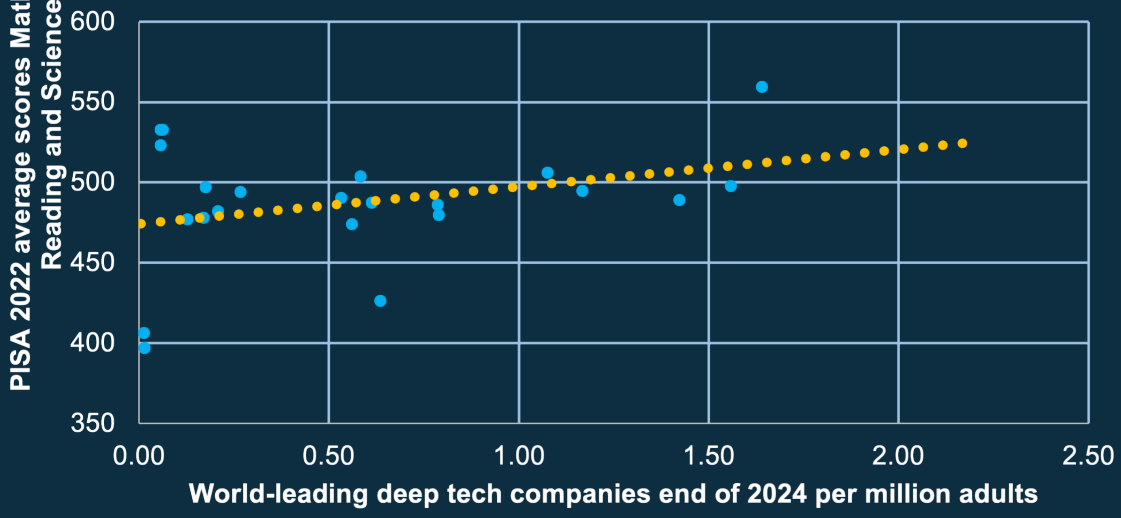
Knowledge plays a key role in technological development, this is shy those countries that have a higher score in the international PISA-results, also tend do have a higher concentration of deep tech companies. Stimulating good school results, through teacher-led education with focus on mathematics, engineering, science, and technology, from early age, is a sound recipe. This makes it possible to climb in PISA-results and particularly encourage those skills that are most relevant for deep tech development.

While the quality basic education is important, elite universities play a key role in deep tech development. The concentration of deep tech companies per million adults, is compared to the number of top 100 universities in engineering & technology per million adults. It is found that those countries which have a higher concentration of top universities in engineering & technology also tend to have more deep tech companies per capita.

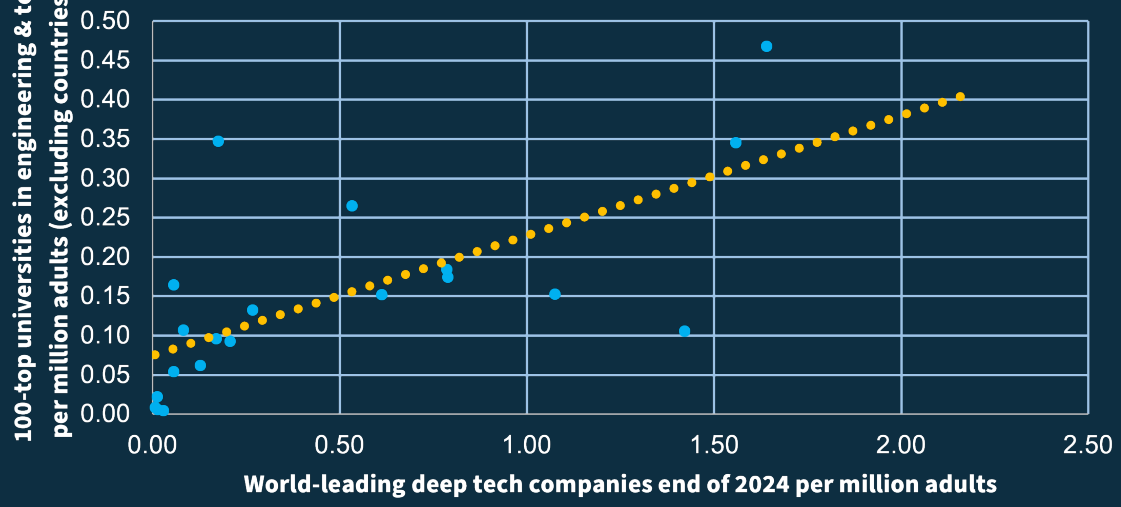
Those countries which have abundance talent in mathematics and technology, combined with competitive taxes and strong private property, are likely to continue growing with deep tech progress.

While the quality basic education is important, elite universities play a key role in deep tech development.

Countries with many world-leading deep tech companies tend to have higher PISA-results



Countries with many world-leading engineering & technology universities also lead in deep tech



Tax policy and property rights are key for deep tech strength

What policies sets apart those countries that have a high concentration of deep tech companies per million adults? Three key elements identified are property rights, taxes on profits and taxes on capital gains.

To begin with, they tend to have strong private property protection. Deep tech development requires significant investments, in immaterial and material goods, and these investments therefore tend to focus on those countries where the protection for private properties are strongest.

Another relevant policy field is taxes. While taxes are needed to fund basic research, infrastructure, welfare, rule of law, and other public goods, high taxes tend to crowd out economic activity. More precisely, countries with high taxes tend to also have high levels of public expenditure. High levels of public expenditure crowds out private expenditure, while high taxes crowd out private sector investments and activity. This can explain why those countries which have lower taxes on profits and investments tend to have a higher concentration of deep tech companies per million adults.

Already 700 years ago, the Tunisian economist and social scientist Ibn Khaldun laid the foundations for the understanding that states often, in connection with expansion towards higher tax levels, created displacement of work, investment and talent. An expanding public sector at some point through excessive taxation crowds out economic activity in the private sector, shrinking the tax base. Arthur Laffer then developed the theory further, in the famous napkin sketch during a dinner. The result is the Laffer-Khaldun curve which shows the link between tax level and tax revenue.[4]

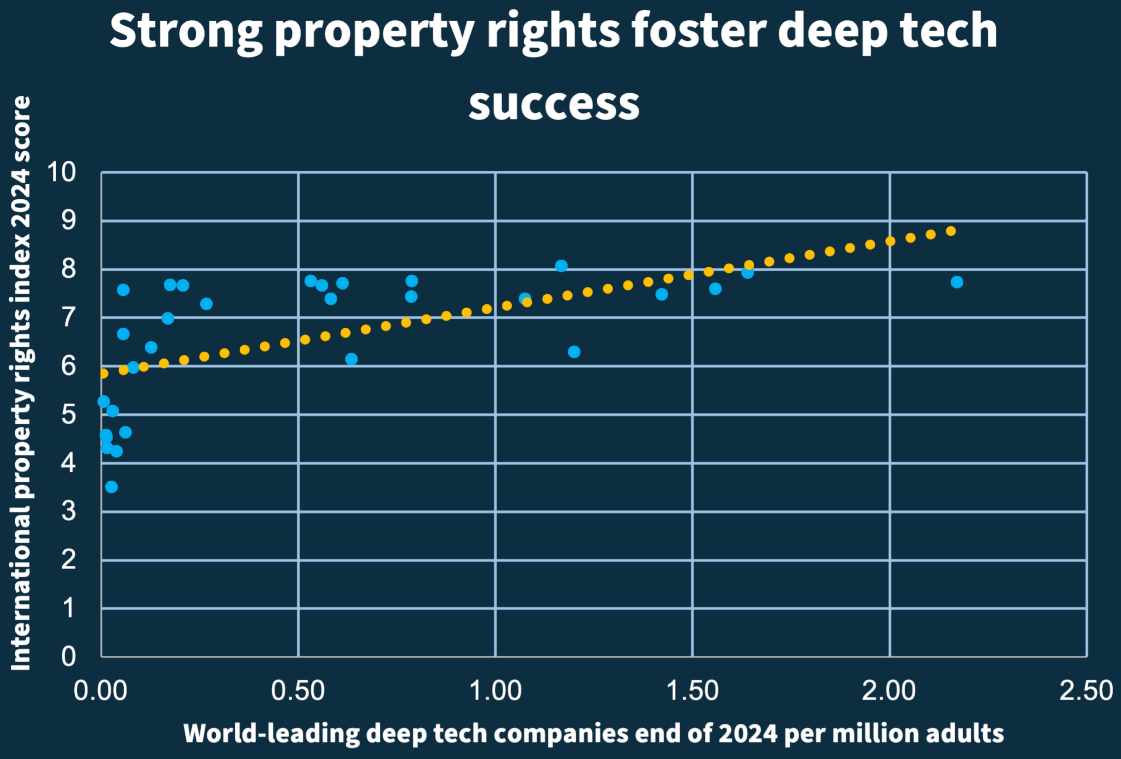
In 2010, economists Mathias Trabandt and Harald Uhlig, in a study published by the European Central Bank, calculated where European countries were on this curve. It turned out that Sweden, Denmark and several other high-tax countries in Europe have such high tax wedges that the taxes on the margins hardly or not at all contribute to net income. This particularly applies to capital taxes but also taxes on work.[5]

4 Sanandaji (2018).

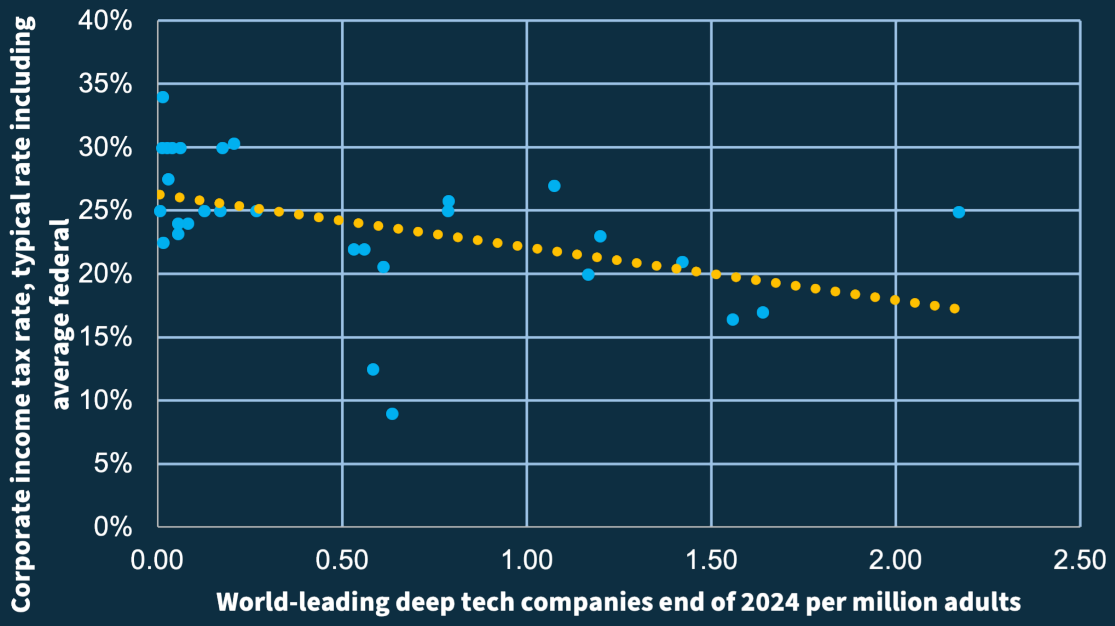
5 European Central Bank (2010).

Reducing taxation can boost deep tech progress, as well as economic growth in general. For example, a recent abolishment of the 5 percent highest marginal tax rate in Sweden has been shown to have had a self-financing degree of between 206 and 237 percent. The top five percent marginal tax on high income takers that was abolished in Sweden was crowding out work to such a degree, that its abolishment led to doubling of the tax revenue. Tax reduction on business profits, capital gains and marginal labor incomes in particular have a strong stimulating effect on economic progress in general. A combination of competitive tax policy and strong protection of private property is important for succeeding in deep tech.

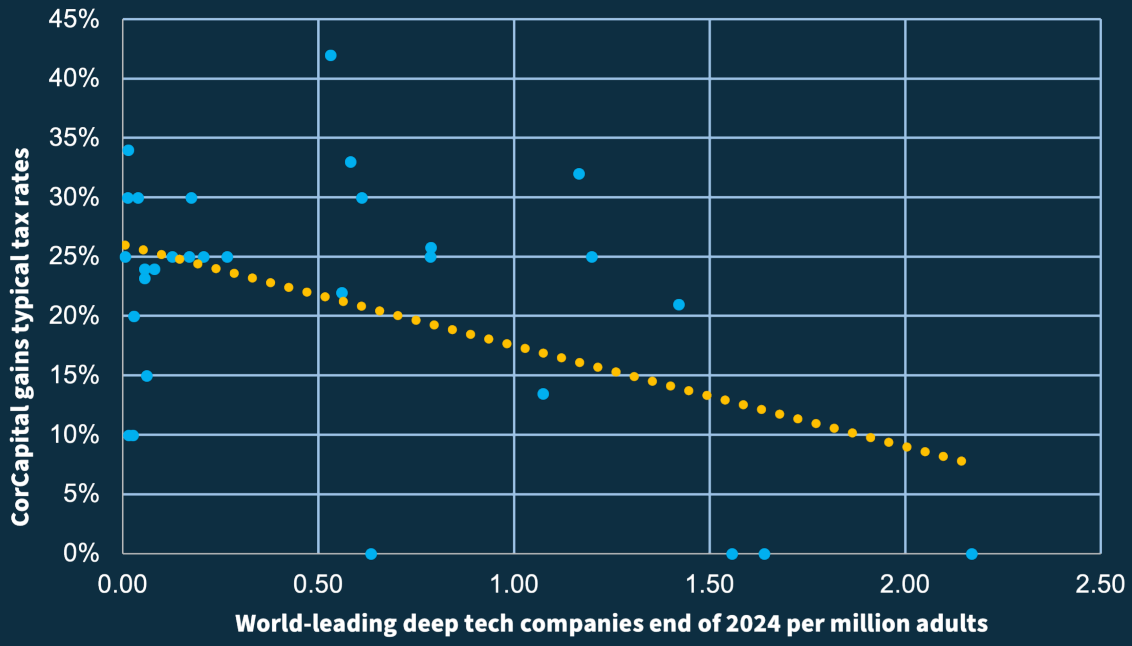
> **A combination of competitive tax policy and strong protection of private property is important for succeeding in deep tech.**



Successful deep tech countries tend to have lower taxes on company profits



Successful deep tech countries tend to have lower capital gains tax rates



Deep tech per capita ranking

In total numbers, above six out of ten deep tech companies are found in the USA. However, once population is accounted for, it is actually Luxembourg that has most deep tech leading companies per capita. Having one world-leading deep tech company allows this state with limited population to achieve 2.17 such companies per million adults.

Singapore has a multitude of world-leading companies in deep tech, and with a larger population ranks second with 1.64 such companies per million adults. Switzerland follows on third place with 1.56, followed by the USA with 1.42. Israel (1.2), Finland (1.17), Canada (1.07), the Netherlands (0.79), the UK. (0.79) and the UAE (0.63) are on the global top 10 list, with Sweden (0.61) juts outside ranked eleventh.

Deep technologies are expensive to develop, and often require significant foreign direct investments. Favorable economic policy factors such as advantageous taxes are important for fostering deep tech progress, both for stimulating entrepreneurs and for gathering the resources.

Favorable economic policy factors such as advantageous taxes are important for fostering deep tech progress, both for stimulating entrepreneurs and for gathering the resources.

	Number of 500 globally leading deep tech companies per million adults
Luxembourg	2.17
Singapore	1.64
Switzerland	1.56
USA	1.42
Israel	1.20
Finland	1.17
Canada	1.07
Netherlands	0.79
UK	0.79
UAE	0.63
Sweden	0.61
Ireland	0.58
Norway	0.56
Denmark	0.53
Belgium	0.27
Germany	0.21
Australia	0.17
France	0.17
Spain	0.13
Italy	0.08
Kenya	0.06
Japan	0.05
South Korea	0.05
Uganda	0.04
India	0.03
Nigeria	0.02
Egypt	0.01
Brazil	0.01
Mexico	0.01
China	0.01

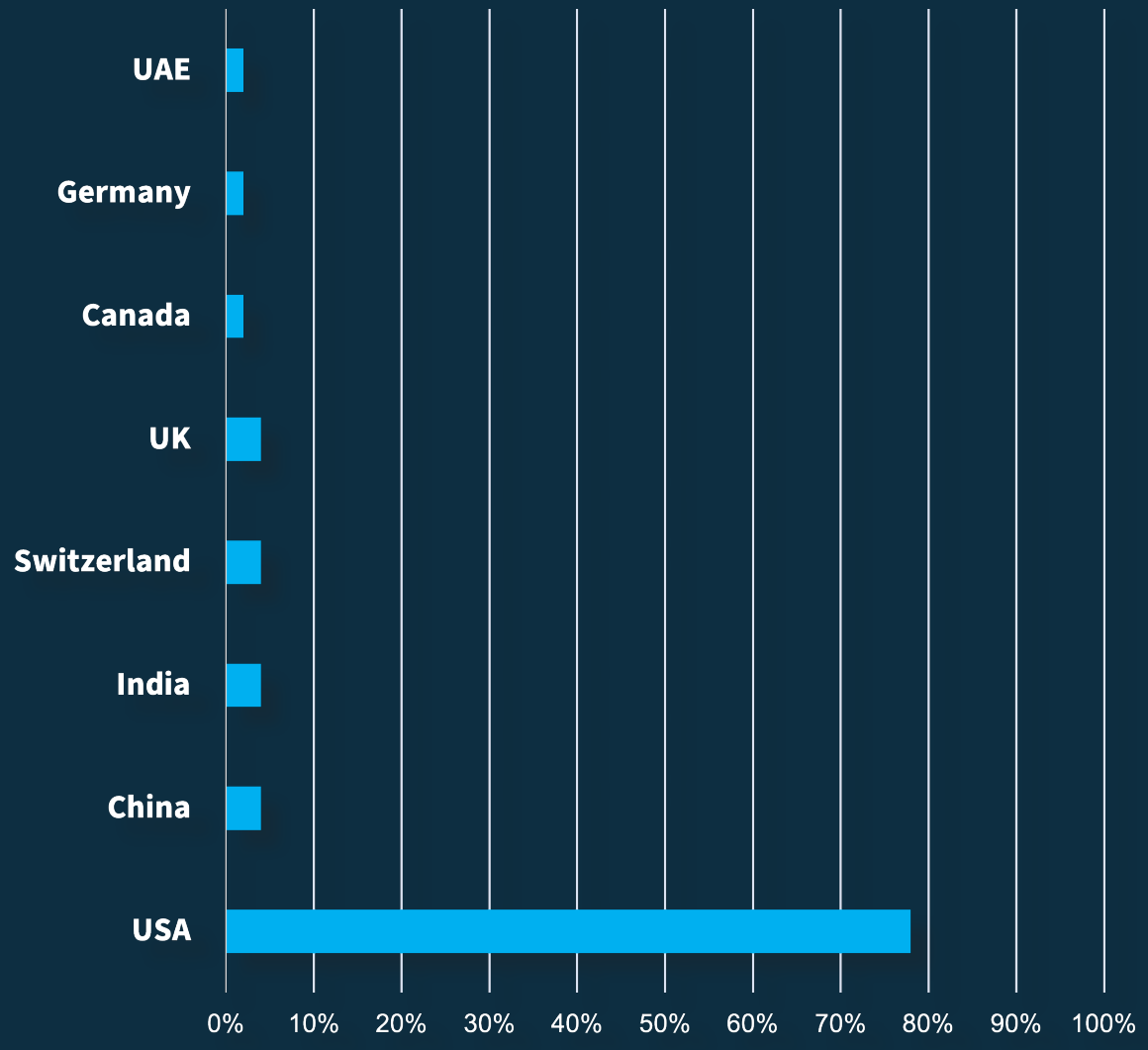
Artificial Intelligence

Artificial Intelligence development is about creating intelligence processes in computer systems and machines. Speech recognition, machine vision, and natural language processing are some applications of Artificial Intelligence. Out of the globally leading companies that are developing this deep technology, fully 80 percent are found in North America. The remaining leading technology companies in Artificial Intelligence are split evenly between 10 percent in Europe, and 10 percent in Asia.

Artificial Intelligence (North America focused)	
North America	80%
Europe	10%
Asia	10%
Rest of world	0%

As much as 42 percent of the leading Artificial Intelligence development is occurring in Santa Clara Valley, popularly known as Silicon Valley. Thomas Edison founded the world's first industrial innovation laboratory in this valley 150 years ago, and it has since become the most significant region for development of new technologies. In North America, Artificial Intelligence development is also focused to New York and Seattle. European centers of Artificial Intelligence development include London, Geneve, Zurich and Munich. In Asia, the development of this deep technology is focused on Mumbai, Hong Kong and Guangzhou.

Artificial Intelligence top-50 companies global distribution



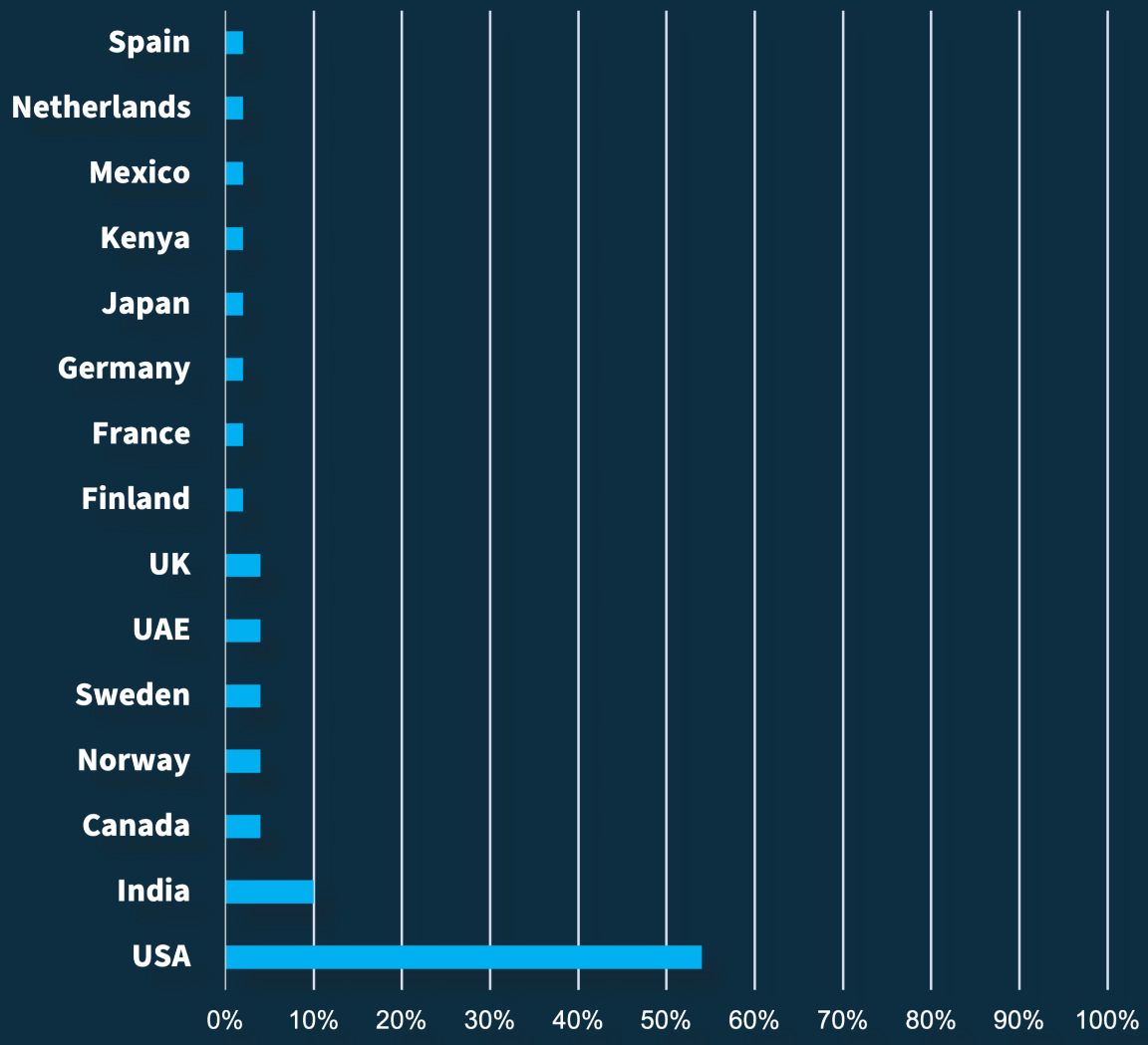
Clean Energy

Clean energy solutions play a key part in the world economy, during a time when there is great demand for energy and a need to shift towards more environmentally sustainable energy production. Amongst those companies that develop this deep technology, 22 percent are found in Europe and 16 percent in Asia. The share of 58 percent is higher in North America, but relatively to the overall deep tech dominance of North America, this area is a relative strength of Europe and Asia. The remaining 4 percent are in Mexico and Kenya.

Clean Energy (Europe & Asia focused)	
North America	58%
Europe	22%
Asia	16%
Rest of world	4%

As the world economy grows and move towards electrification, the demand for energy supply increases. At the same time, there is a strong political pressure to shift away from hydrocarbons due to environmental concerns of the greenhouse effect. Those countries that succeed most with developing clean energy solutions, will have the best opportunity to fuel their future economic growth. European centers of clean tech include Stockholm, Eindhoven, Espoo, London, Madrid and Paris. Asian centers include New Delhi, Abu Dhabi, Bengaluru, Mumbai and Yokohama.

Clean Energy top-50 companies global distribution



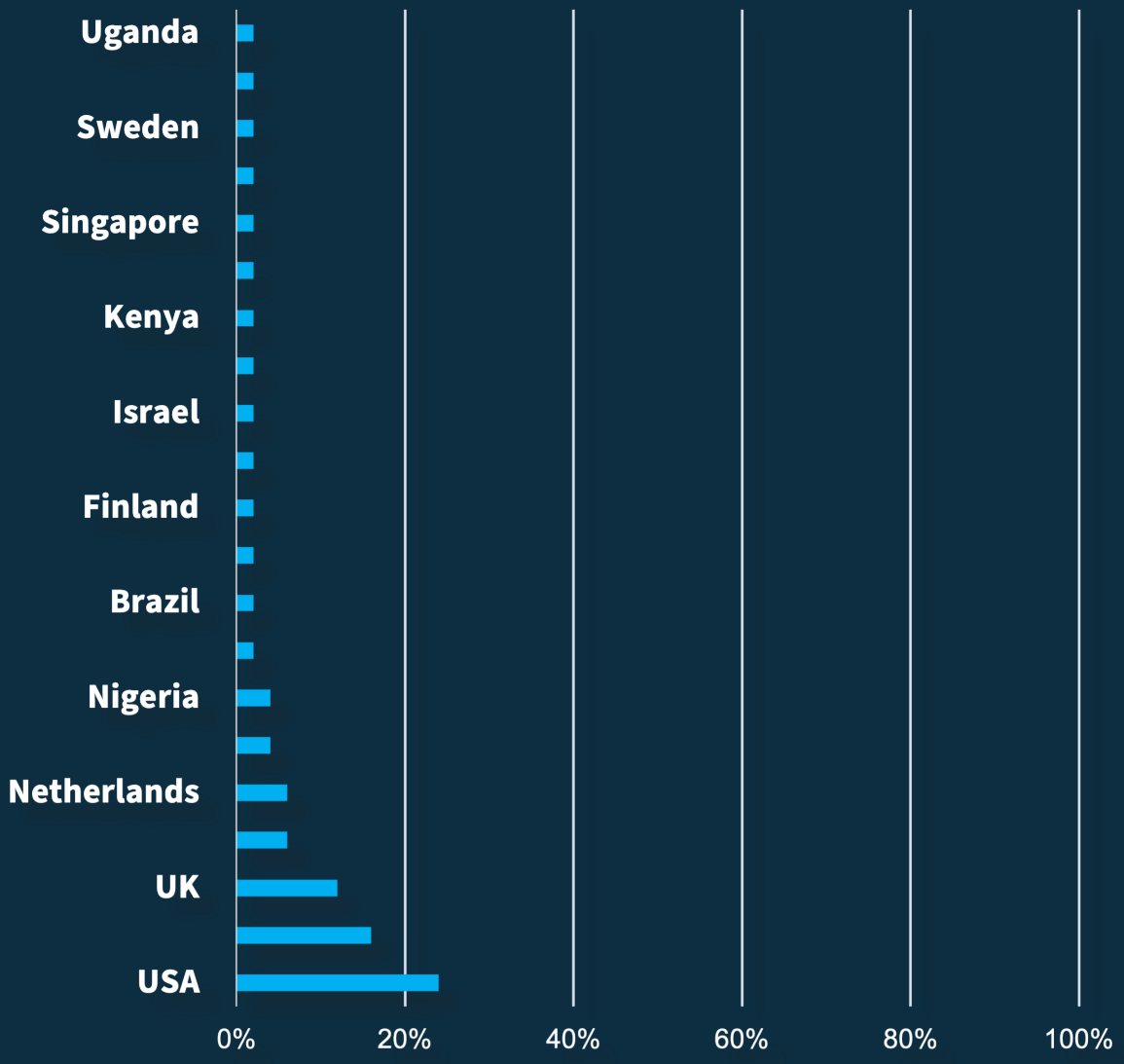
Clean Tech

Internationally, there is growing public demand for environmental sustainability. An important part of this development occurs through clean tech solutions, which are about fostering a cyclical economic model where goods, components, and materials are increasingly recycled. Europe and the rest of the world, in particular Africa, have relative strengths in this deep tech field. While 34 percent of the world-leading deep tech companies in clean tech are situated in Europe, additionally 14 percent are in the rest of the world. This is an exception to the other deep tech fields, where nearly all development is focused to North America, Europe and Asia.

Copenhagen, London, Amsterdam and Eindhoven are European clean tech centers. Abuja, Cairo, Kampala, Lagos and Nairobi are leading African deep tech centers in this field. While much of the world is going towards demographic decline, Africa is still growing its population, creating demand for clean tech solutions.

Clean Tech (Europe & Africa focused)	
North America	40%
Europe	34%
Asia	12%
Rest of world	14%

Clean Tech top-50 companies global distribution



Biotechnology

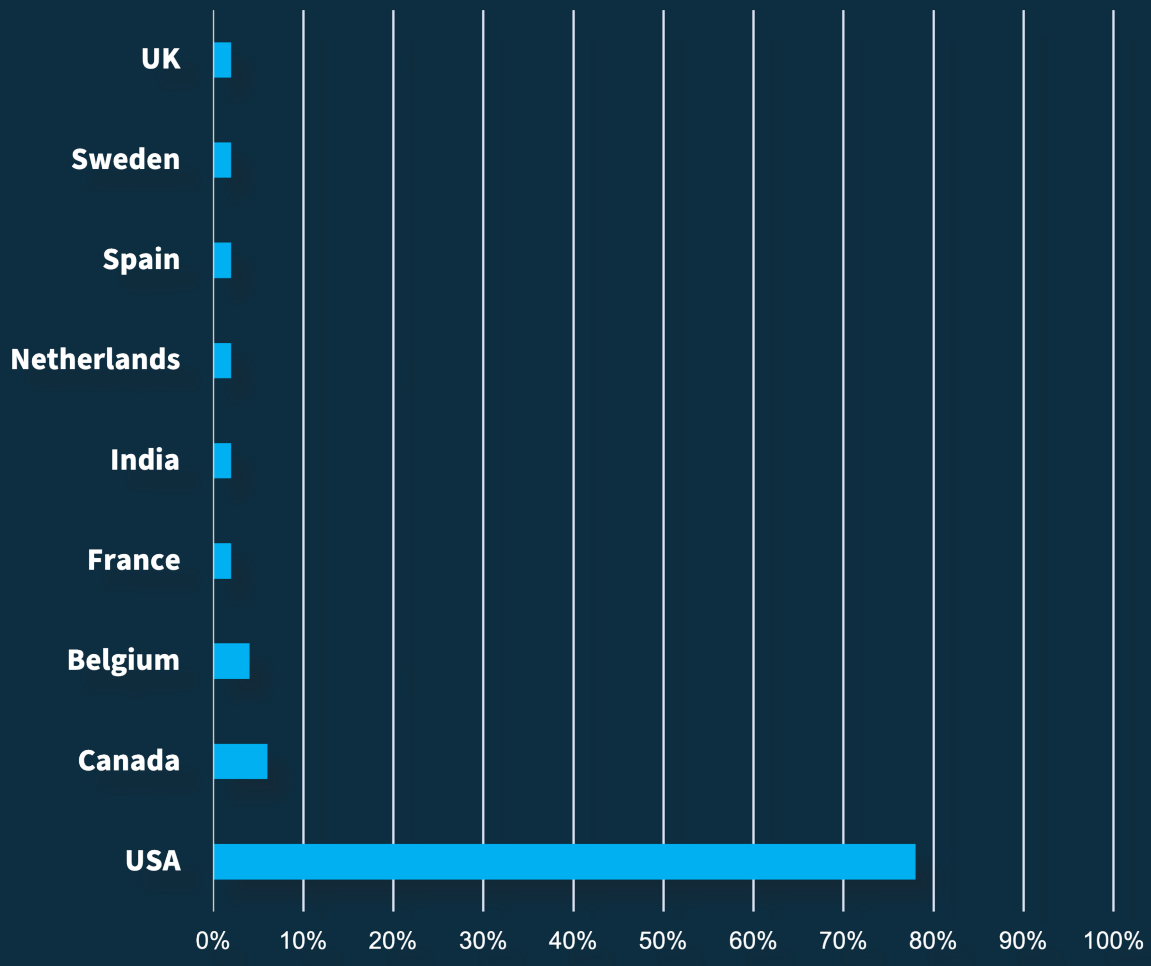
The progress of biotechnology already offers many solutions for human health and longevity, with significant further progress on the way. For the first time in human history, scientists are able to understand the core foundation of ageing, leading to various biotechnology solutions for longevity and health. Only recently has the full human genome been mapped, opening up great possibilities to better understand the biotechnology that makes our cells function as they should.

Amongst those companies that develop this deep technology, fully 84 percent are found in the USA. Boston, New York and San Diego are some of the leading North American centers, while the dominant one is Santa Clara Valley. Vancouver in Canada is also an important center for biotechnology deep tech.

Biotechnology has many uses besides promoting longevity and human health. Biotechnology also has a key role in the global food industry, as well as in development of sustainable materials. Countries and regions that have a deep technology lead in biotechnology can use this advantage to promote exports, and through that rising living standard.

Biotechnology (North America focused)	
North America	84%
Europe	14%
Asia	2%
Rest of world	0%

Biotechnology top-50 companies global distribution



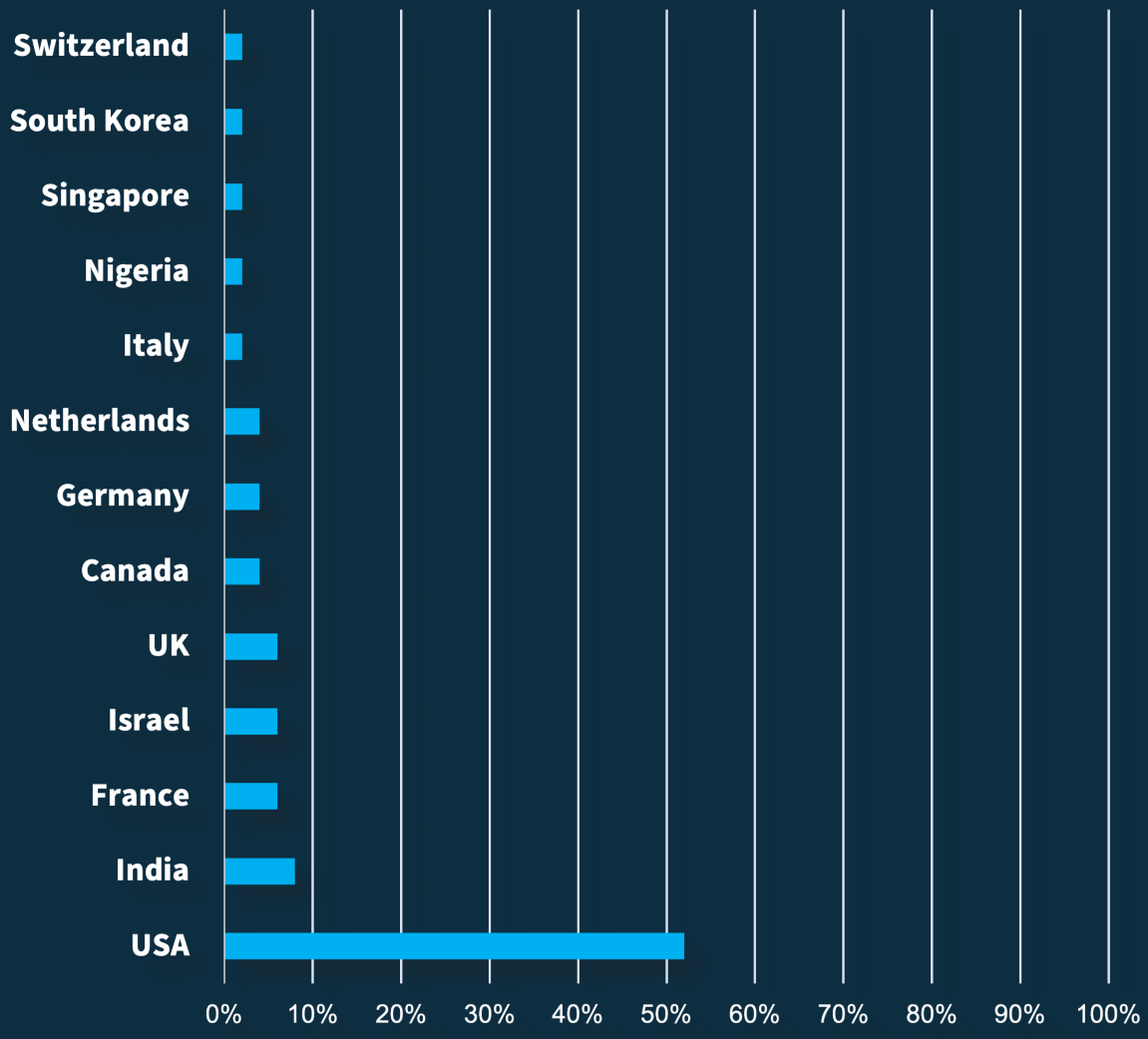
Photonic & Electronic

Photonic & Electronic are a couple of closely related fields of technology, which have significant impact on global development. While in an electronic chip, electron flux passes electrical components such as transistors and resistors, photonic chips are based on photon passing through optical components. Amongst those companies that develop this deep technology, 24 percent are found in Europe and 18 percent in Asia, a higher share than most other technology area.

European centers of photonic & electronic development include Eindhoven, Paris, Cambridge, Milan and Zurich. Asian centers include Mumbai, Bengaluru, New Delhi and Netanya. Photonics has applications in telecommunications and processing of information, as well as in lighting, robotics, biophotonics, holography, military technology including lasers, and spectroscopy. Much of technological development is related to photonics in some way, while electronic development continues to be a key part of technological progress. Countries and regions that are leading in development of photonic & electronic, therefore gain an economic advantage.

Photonic & Electronic (Asia & Europe focused)	
North America	56%
Europe	24%
Asia	18%
Rest of world	2%

Photonic & Electronic top-50 companies global distribution



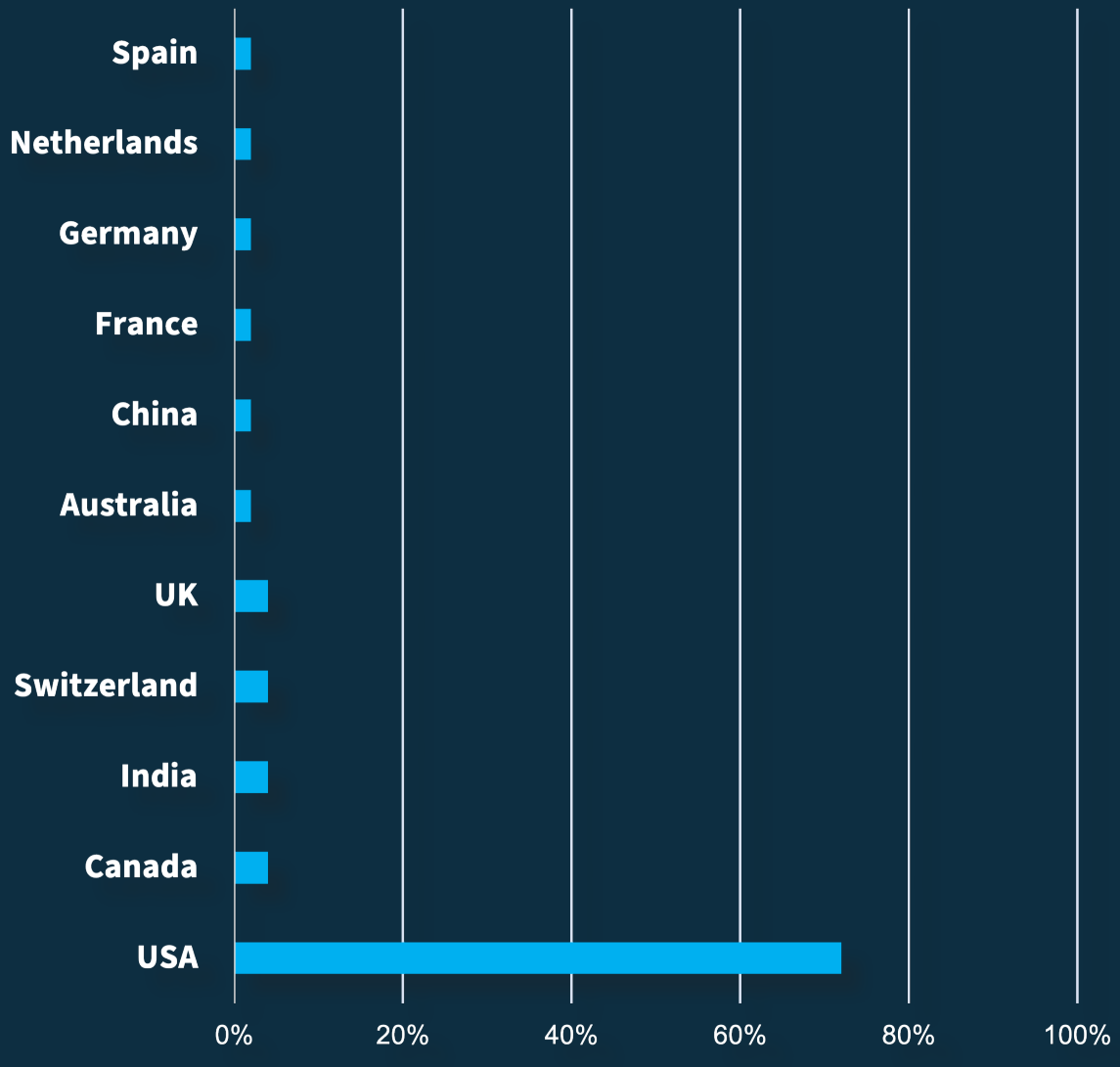
Robotic & Communication

Robotics & Communication technology are influencing the global economy. Robots have been a key part of industrial development for decades, and are becoming increasingly advanced, with even humanoid robots recently becoming a reality. Communications and robotics are both technologies that are changing progressively, impacting significantly on businesses and how we live our daily lives. The large majority of 76 percent of the world´s leading companies in robotics & communication development are found in North America.

Robotic & Communication (North America focused)	
North America	76%
Europe	16%
Asia	6%
Rest of world	2%

Besides Santa Clara Valley, also Austin, Los Angeles, and Chicago are important hubs of development. Toronto and Montreal in Canada also have some strengths in robotic & communication. Robotics & Communication technologies are fundamental for the future of manufacturing industries, but also services and communication. Those countries and regions that have an edge in this field of technology are likely to benefit from this.

Robotic & Communication top-50 companies global distribution



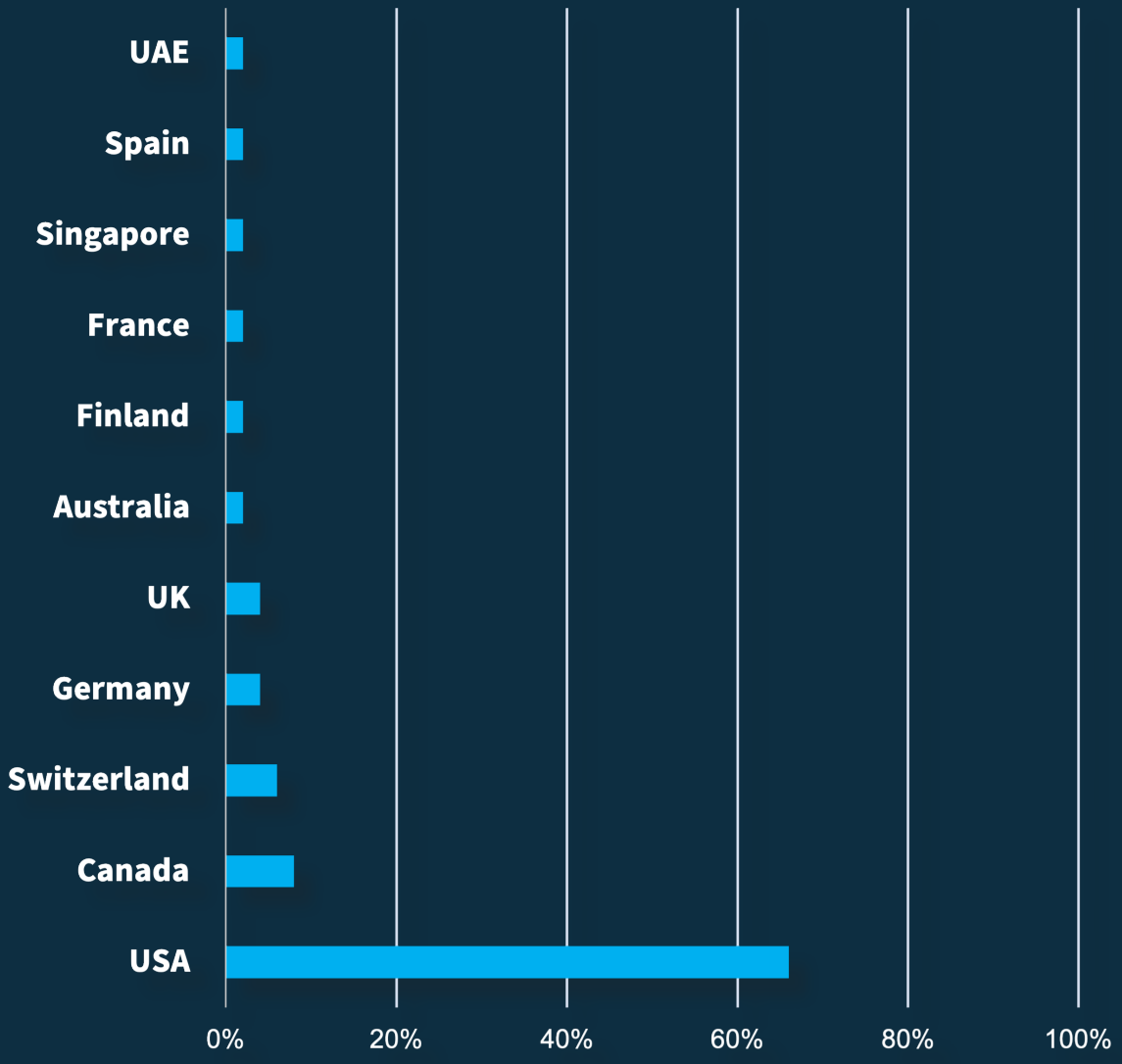
Quantum & Computing

As recently as the 1960s, mechanical calculators were still used around the world. This is now a past memory since the development of electronic computing has revolutionized the world. Many people today have today stronger computing powers in their mobile phones, than the computers used for the first moon landing. While binary computer technology continues to evolve, it is now complemented by quantum computing, which relies on quantum bits instead of binary digits. Amongst those companies that develop this deep technology, 74 percent are found in North America and 20 percent in Europe, both continents have relative strengths here.

Santa Clara Valley, Boston, Denver, Vancouver and New York are some deep tech centers of quantum & computing in North America. European centers include Zurich, Berlin, Cambridge, Espoo, London and Paris. Quantum computing is ultimately a novel concept, capable of many parallel processes. Some problems can be solved significantly faster by quantum computing, particularly those including complex relationships. Regions that have been the focus of traditional computers have thrived historically, and the same is likely to be the case for those regions that lead the future of quantum & computing.

Quantum & Computing (North America & Europe focused)	
North America	74%
Europe	20%
Asia	4%
Rest of world	2%

Quantum & Computing top-50 companies global distribution



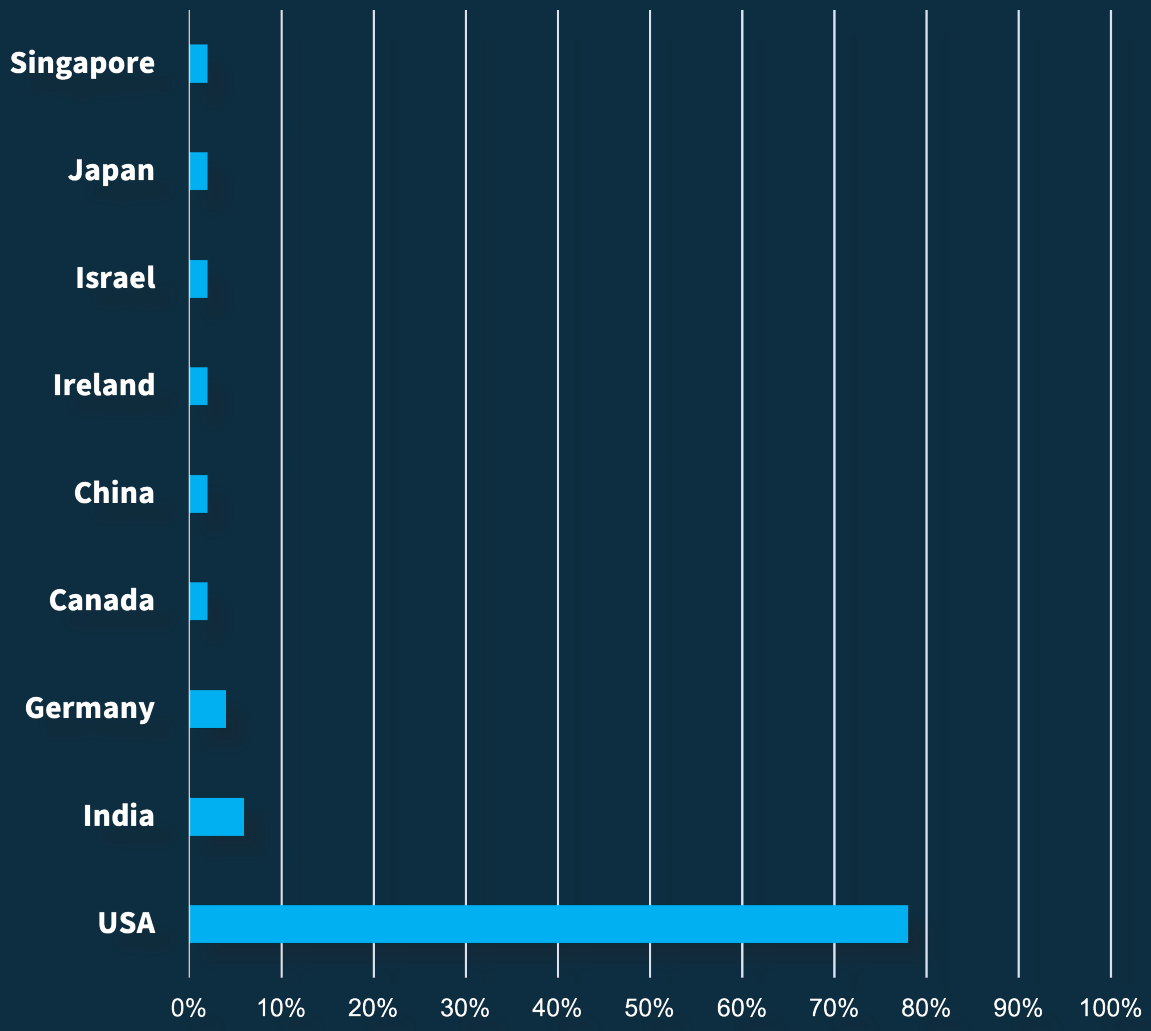
Pharmaceuticals

Throughout the world, there is a trend of increasing life span and more healthy years. This progress is linked to development of Pharmaceuticals. An increasingly large share of the world population is today elderly, pushing up the global demand for Pharmaceuticals. Amongst those companies that develop this deep technology, 80 percent are found in North America and 14 percent in Asia.

In North America, Boston and San Diego are particularly strong centers of pharmaceutical development. Santa Clara Valley, New York and Chicago are additional important centers. Asian deep tech centers of pharmaceuticals includes Bengaluru, Mumbai, Shanghai, Singapore, Tel Aviv and Tokyo. Demand for Pharmaceuticals is rising, due to several factors. To begin with, the higher life span means an increasingly high need for pharmaceuticals, as sickness increases with age. As living standards rise in the world, a higher share of incomes is directed to medicine. There is also a significant development of new medicines, based on genes, cells, and tissues. Those regions which are leading in development of pharmaceuticals, are therefore likely to attract investments, and generate export revenues.

Pharmaceuticals (North America & Asia focused)	
North America	80%
Europe	6%
Asia	14%
Rest of world	0%

Pharmaceuticals top-50 companies global distribution



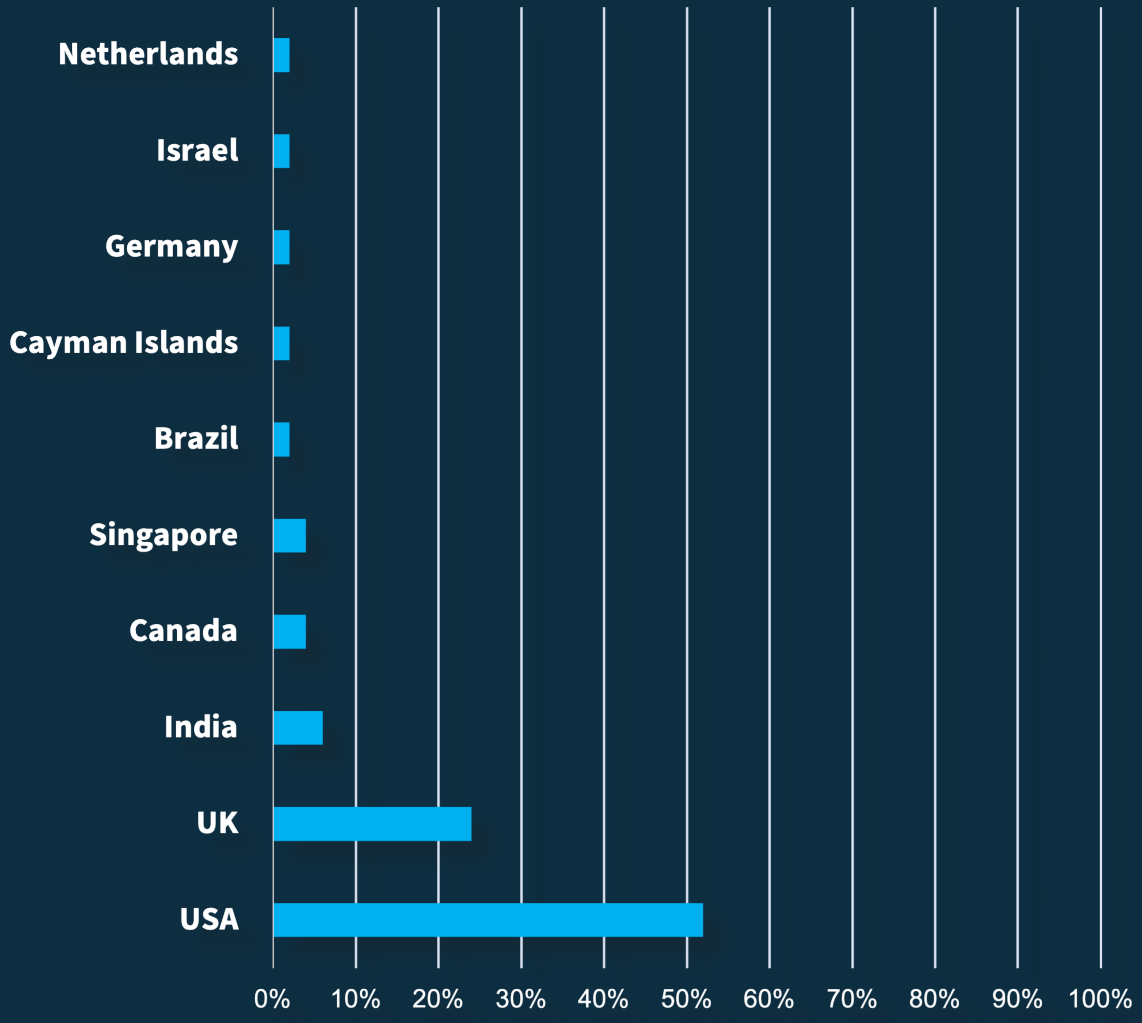
Fintech

Financial technologies, or fintech, play a key role in the world´s economy. Financial innovations, coupled to various digital solutions, promote investments and trade. Fintech solutions rely on specialized software on computers and phones, which promote safe and efficient financial transactions. Amongst those companies that develop this deep technology, 28 percent are found in Europe, making it a relative strength.

London is the main global center of fintech development, other European centers include Amsterdam and Berlin. Finance is a driver for economic progress, why those regions that have strong Fintech presence have an advantage in terms of future growth potential.

Fintech (Europe focused)	
North America	58%
Europe	28%
Asia	12%
Rest of world	2%

Fintech top-50 companies global distribution



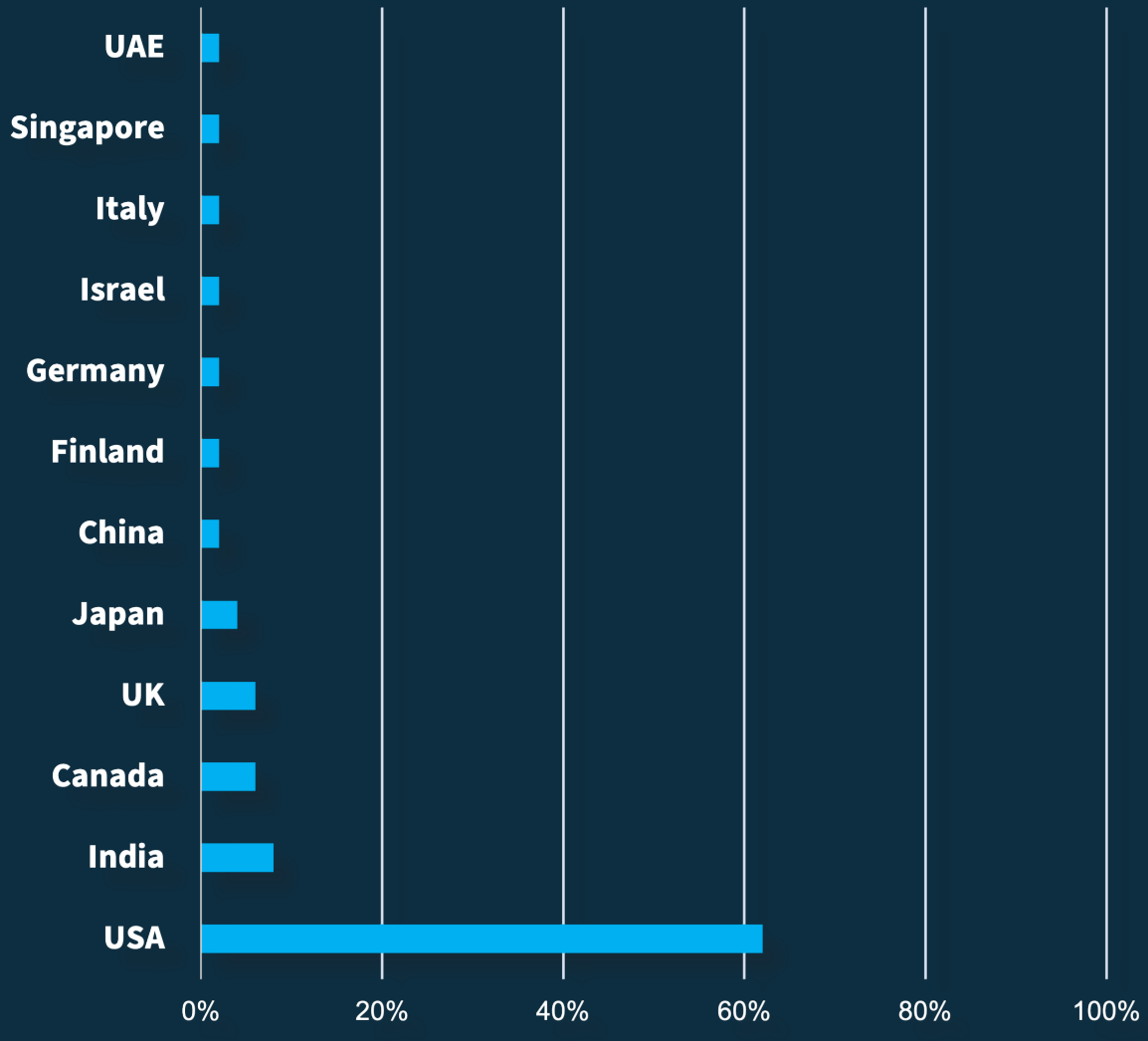
Space & Advanced Materials

Space is in many ways the future of human progress. While space travel has been achieved for the past half century, it is only recently that private companies are able to overcome the technological and economical barriers to making space travel viable. Advanced material development is closely related since new materials are developed for space travel. Development of advanced materials also has many other industrial uses. Amongst those companies that develop deep technology of Space & Advanced Materials, 20 percent are found in Asia, a higher share than for any other area of deep technology.

New Delhi, Abu Dhabi, Ahmedabad (India), Beijing, Mumbai, Sapporo, Tsuruoka and Singapore are Asian centers of space & advanced materials. Space in many ways is the final frontier for expansion, with massive opportunities to come in future decades. Advanced materials development is a key part of the space race, but also crucially important for industrial applications. Those regions that lead the race for space & advanced Materials, can tap into the unprecedented future revenues from the space industry.

Space & Advanced Materials (Asia focused)	
North America	68%
Europe	12%
Asia	20%
Rest of world	0%

Space & Advanced materials top-50 companies global distribution



References

Brown, R., & A. Rocha (2020). “Entrepreneurial uncertainty during the Covid-19 crisis: Mapping the temporal dynamics of entrepreneurial finance”, Journal of Business Venturing Insights, 14, e00174.

Crunchbase database.

Dalle, J.M., M. Den Besten & C. Menon (2017). ”Using Crunchbase for economic and managerial research”, OECD Science, Technology and Industry Working Papers 2017/08.

European Central Bank (2010). “How fare are we from the slippery slope? The Laffer curve revisited”, Mathias Trabandt & Harald Uhlig, Working paper series, no. 1174, April.

International property rights index 2023.

Liang, Y.E. & S.T.D. Yuan (2016). ”Predicting investor funding behavior using crunchbase social network features”, Internet Research.

OECD, PISA 2022 results.

PWC, tax rates around the world.

QS World University Rankings by Subject 2024: Engineering & Technology

Sanandaji, N. (2018). “The Birthplace of Capitalism: The Middle East”, Timbro.

Svenskt Näringsliv (2024). “Skattebaseffekter av värnskattens avskaffande”, PM Fredrik Carlgren, 2024-04-22.

World Bank, world development indicators.

Layout & graphic design: Andreea Ioana Sutac