2022

Internet Economy Report 2022

Status Quo, Outlook & Recommendations

01 Looking back to see what lies ahead

What events have shaped the internet economy in recent months?

The European tech sector outpaces the overall economy ...

Between 2009 and 2019, the European tech sector's gross value added (GVA) nearly doubled

In the same period, non-tech sectors grew only by roughly a third

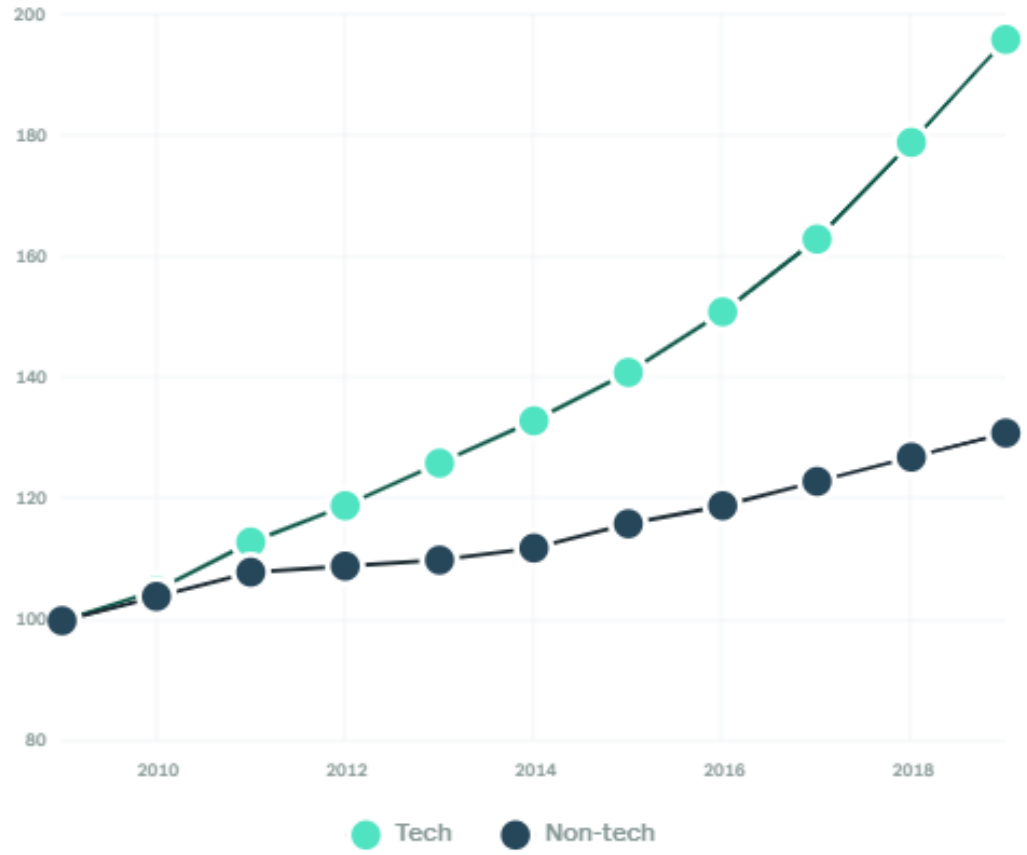
This highlights once again tech's importance for the overall economic growth within the EU

1)Gross value added refers to the value generated by any unit engaged in the production of goods and services

2)Current prices, tech sector comprises NACE codes J62 and J63 / Europe = EU27 and Norway, Switzerland

3)Source: Eurostat

Volumes of tech and non-tech gross value added [index, 2009 = 100]



... but still lags behind the US tech industry, which has more than doubled its gross value added since 2009

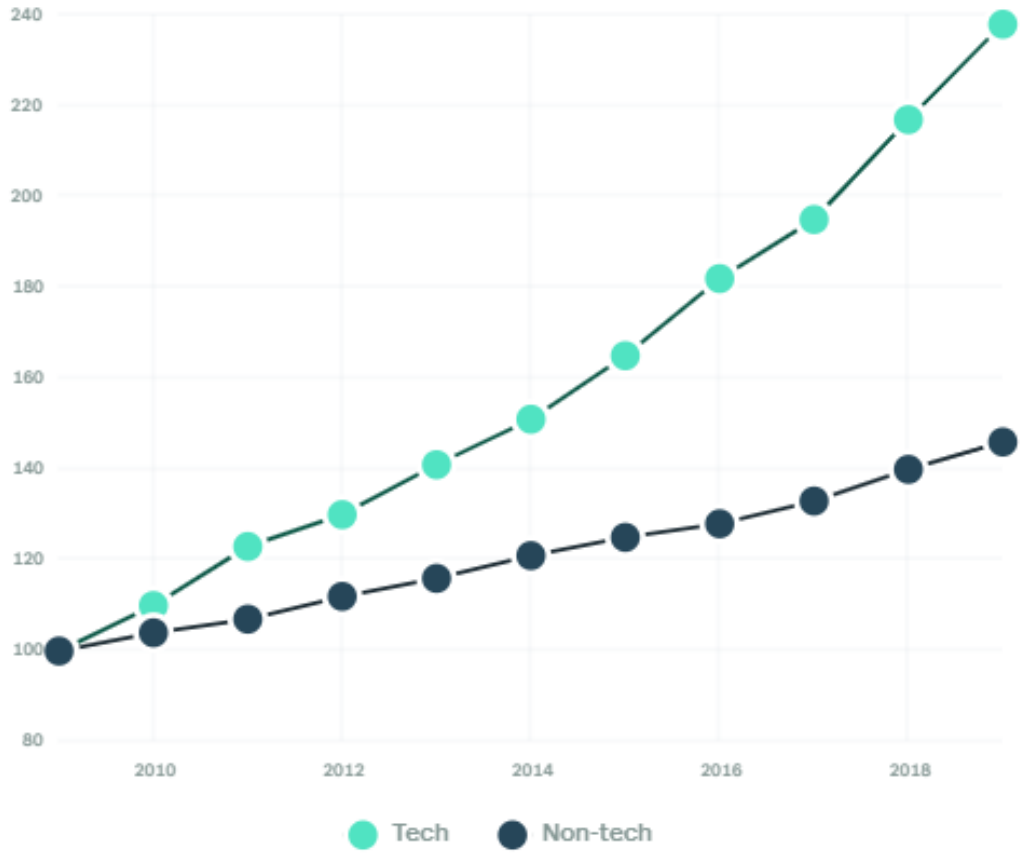
Between 2009 and 2019, the US tech sector's GVA grew by 238%

During this time, the non-tech sectors in the US grew by only 46%

This shows that the tech sector is also a crucial driver of economic growth in the US

Compared to Europe, the US tech sector grew at a significantly faster pace over the same period

Volumes of tech and non-tech gross value added [index, 2009 = 100]



1)Gross value added refers to the value generated by any unit engaged in the production of goods and services

2)Current prices, tech sector comprises NAICS codes 518, 519 and 5415

3)As opposed to the EU, 2020 data for the US is available but not shown due to reasons of comparability

4)Source: United States Bureau of Economic Analysis

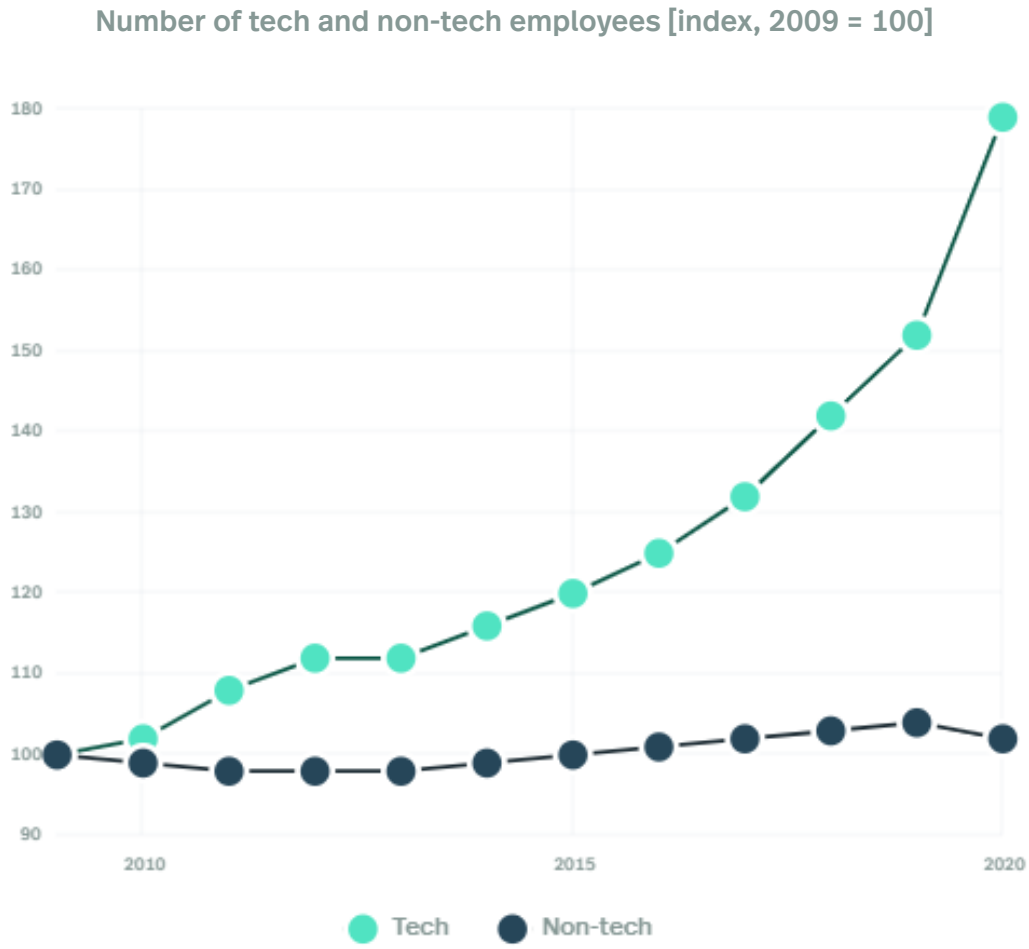
European tech companies have added a large number of new jobs in recent years ...

The European tech sector not only contributes to the overall economy but now directly employs roughly 1.9 million more people than in 2009 – an increase of 79%

In the same period, the total labor force in Europe increased by only 2%

While the overall employment level fell during the pandemic, the tech sector was able to add new jobs to the economy

However, the leap from 2019 to 2020 is less pronounced than that shown in the data due to statistical adaptations at Eurostat



1)Tech employees comprise all employees in business sectors J62 and J63 (NACE) / Europe = EU27, Norway and Switzerland

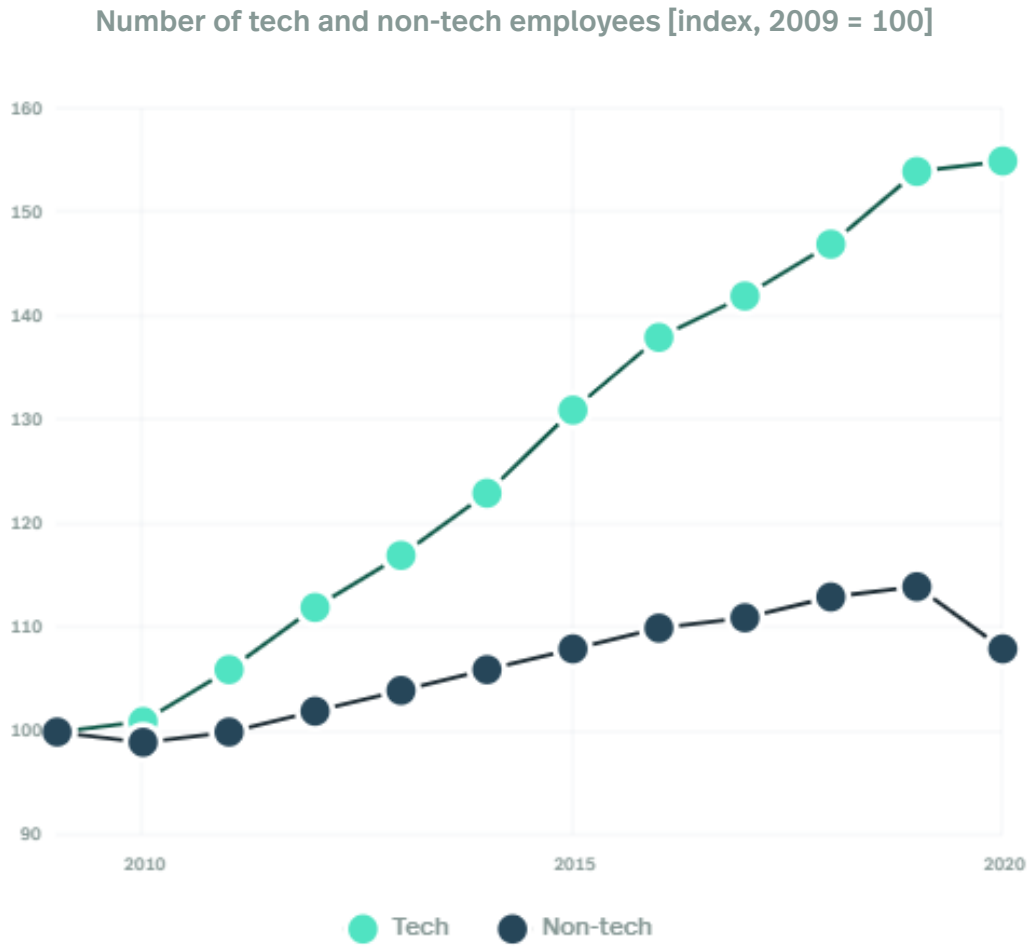
2)Source: Eurostat

... and are now increasing their workforce at a faster pace than their US competitors

The US tech sector increased its workforce by 55% since 2009, while the workforce in the remaining economy grew by only 8% (agriculture sector excluded)

The relative growth of tech workers in the US is smaller than the growth seen in Europe

Given the fact that the US tech sector's GVA has grown much faster than in Europe, this hints at a widening productivity gap: Europe's workforce increase has not translated into a similar growth in GVA to that witnessed in the US



1)Tech employees comprise all employees in business sectors 5415, 518 and 519 (NAICS); non-tech employees include only non-farm labor; no 2021 data shown for reasons of comparability

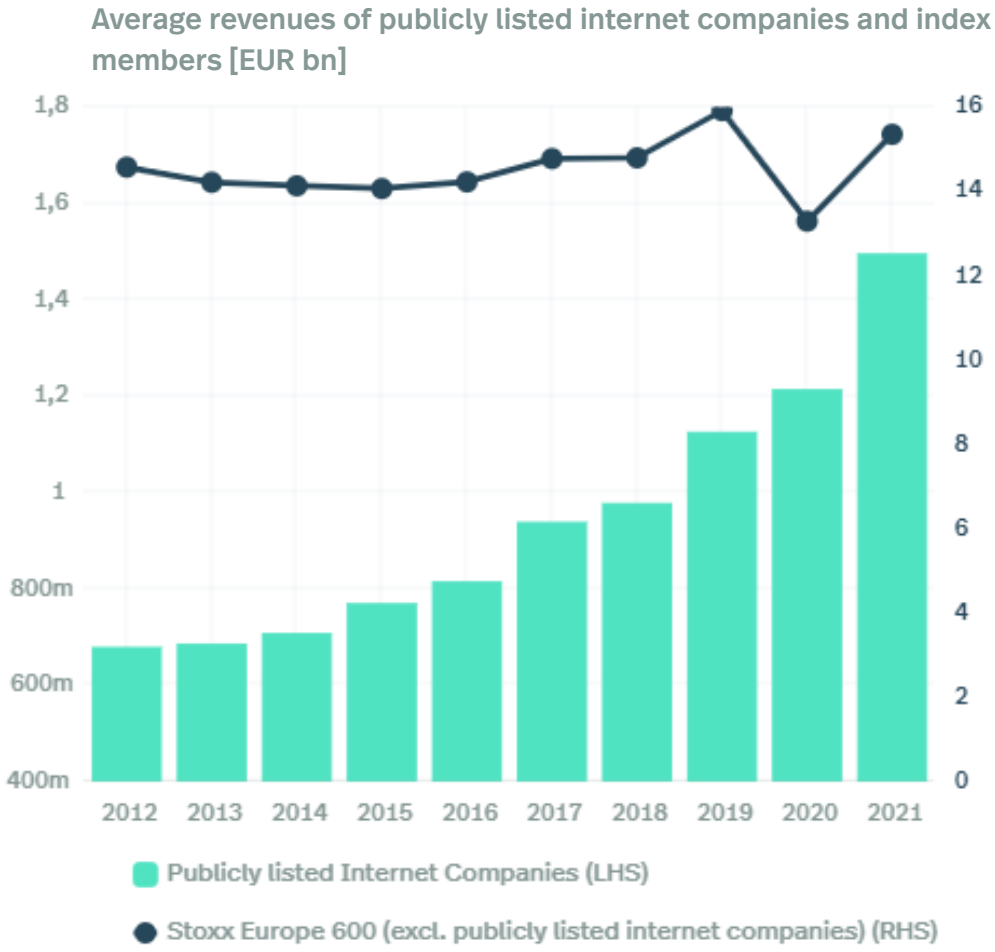
2)As opposed to the EU, 2021 data for the US is available but not shown due to reasons of comparability

3)Sources: United States Bureau of Economic Analysis, Daxx.com, OECD

On average, European publicly listed internet companies grew their revenues much faster than the average Stoxx Europe 600 member

Stoxx Europe 600 members experienced a decrease in revenue during the first year of the pandemic but have recovered in 2021. Compared to that, European internet companies were able to increase their revenues substantially

For data sampling and comparison, publicly listed internet companies were excluded from the Stoxx Europe 600; in 2012, only six of the top 100 publicly listed internet companies were part of the Stoxx Europe 600; by 2022, this index included 21 such companies



1)Top 100 publicly listed companies in Europe by revenues, with internet companies being defined as the sectors "Application Software", "E-Commerce Discretionary", "Infrastructure Software", "Internet Based Services", "Internet Media"

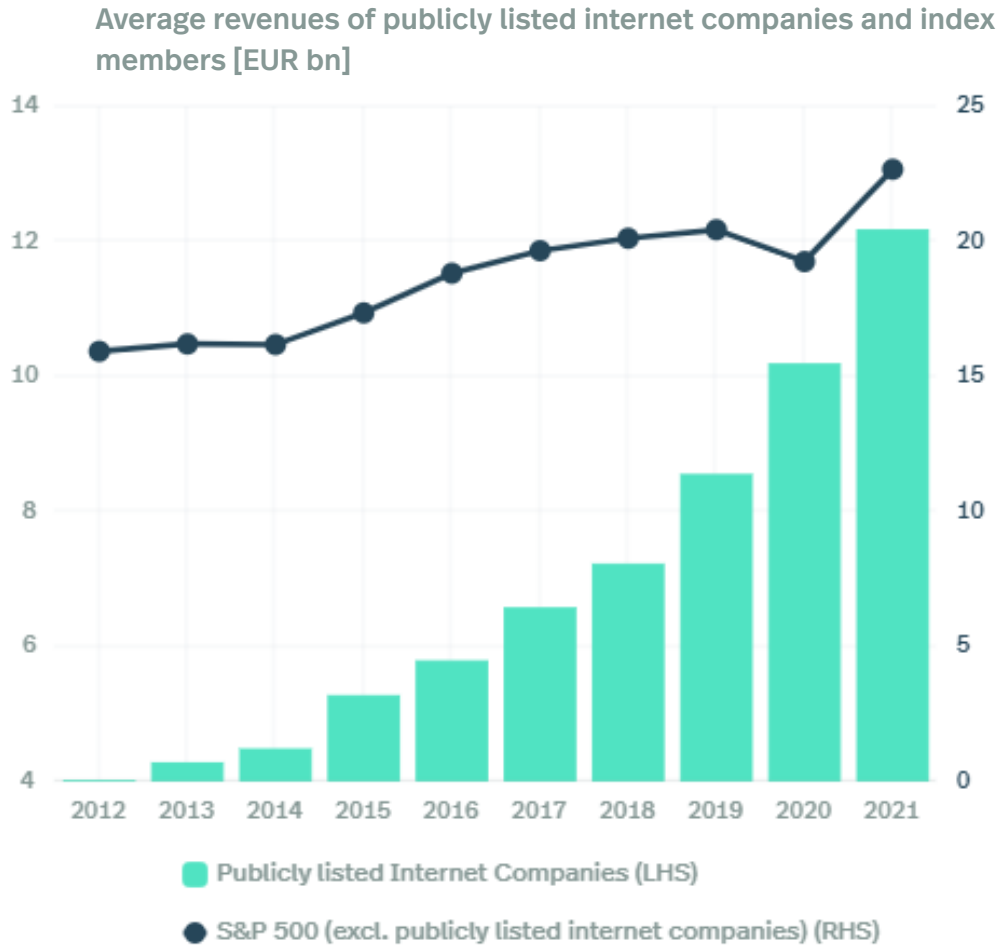
2)Source: Bloomberg

The difference is less pronounced in the US, where all companies saw stronger revenue growth when compared to Europe

Between 2012 and 2021, US publicly listed internet companies, on average, grew their revenues four times as much as the average member of the S&P 500 index

Here, the pandemic has left its mark. In 2020, the revenues of S&P 500 listed companies decreased slightly. Internet companies, on the other hand, were able to benefit substantially from the push in digitalization and even grew during the pandemic

For data sampling and comparison, publicly listed internet companies were excluded from the S&P 500; in 2012, 21 of the top 100 publicly listed internet companies were part of the S&P 500; by 2021, this index held 31 such companies



1)Top 100 publicly listed companies in the US by revenues, with internet companies being defined as the sectors "Application Software", "E-Commerce Discretionary", "Infrastructure Software", "Internet Based Services", "Internet Media"

2)Source: Bloomberg

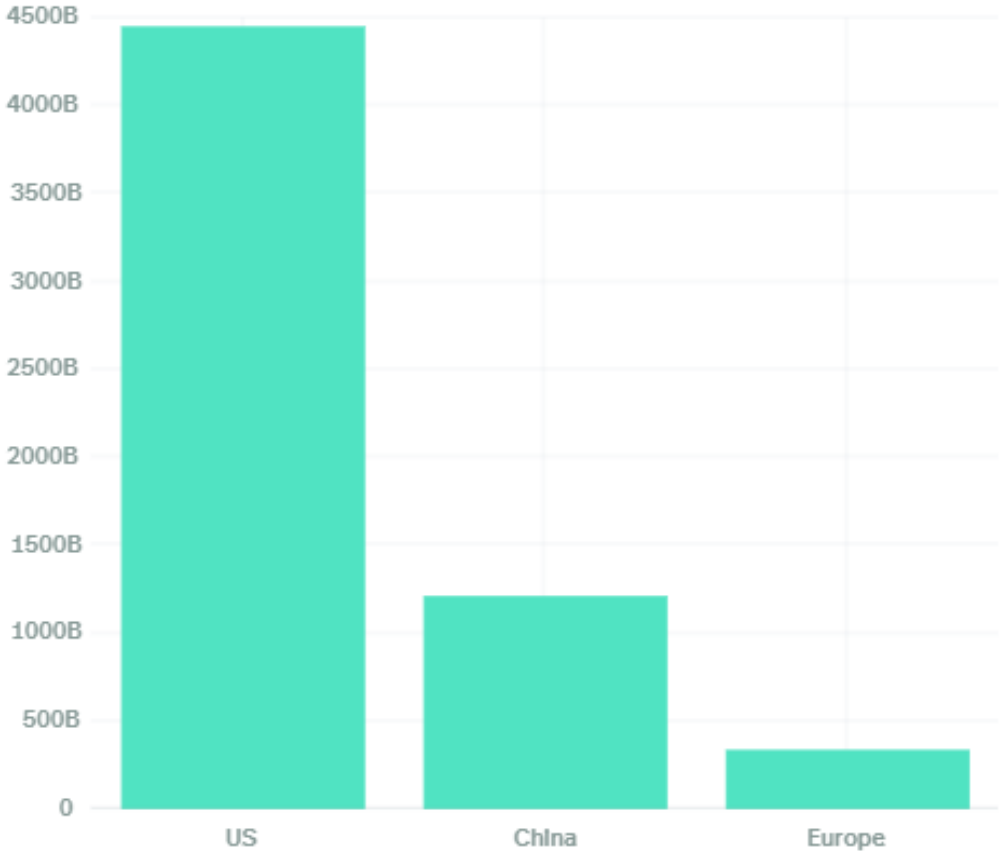
A comparison of the ten most valuable internet companies reveals the dominance of the US economy in the digital arena

Though comparisons of specific sectors are always difficult because they depend on a common definition of what exactly constitutes an internet company, the chart strikingly illustrates the US dominance in the internet economy

1)Top 10 publicly listed companies in the US, China and Europe by market cap, with internet companies being defined as the sectors "Application Software", "E-Commerce Discretionary", "Infrastructure Software", "Internet Based Services", "Internet Media"

2)Source: Bloomberg

Market capitalization of top 10 internet companies1) [June 13, 2022, EUR]



01 - Key Takeaway

The European tech sector's growth outstrips growth levels seen in the wider economy but remains below US tech sector levels

02 The internet economy depends on infrastructure

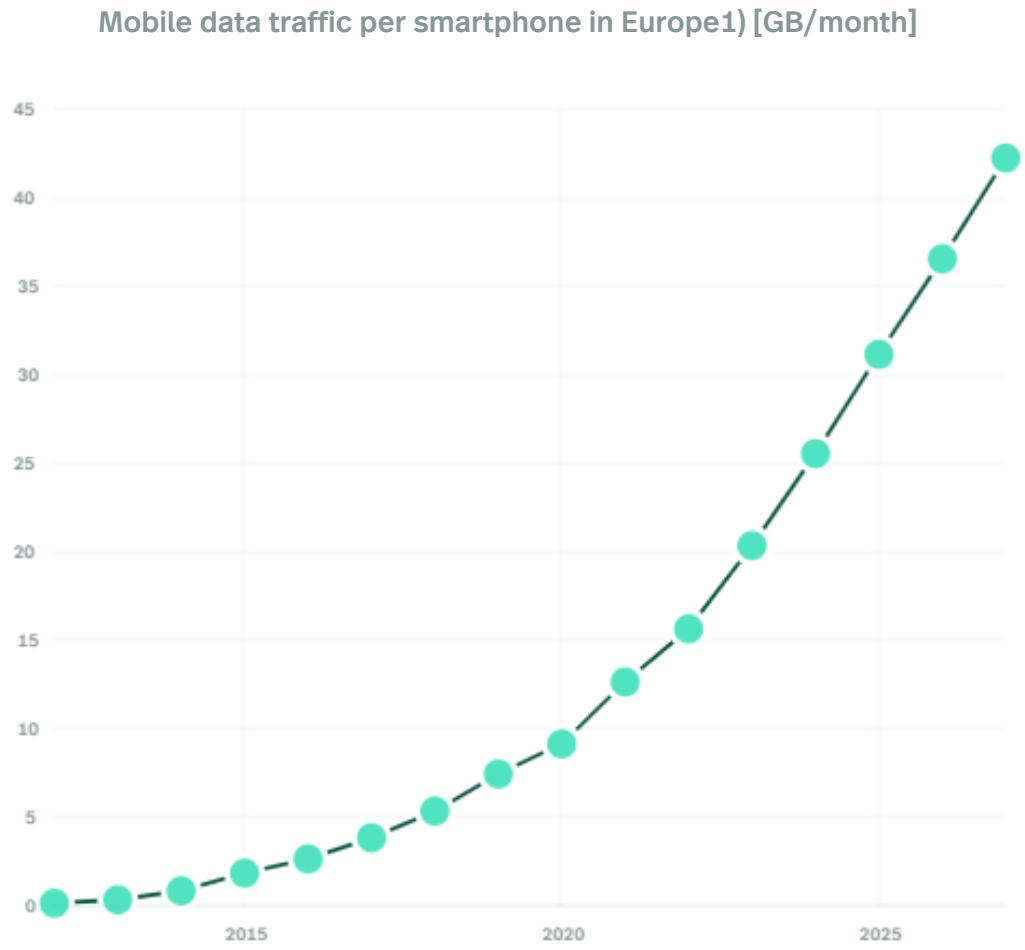
Foundations of the internet economy – Part I

Mobile data traffic per smartphone is increasing at a record pace across Europe

In 2021, the average data traffic per smartphone amounted to 12.7 GB per month. Since 2012, this number has grown at a yearly rate of 42%

Overall, the amount of mobile data traffic per smartphone is growing rapidly: Between 2012 and 2015, mobile data traffic per smartphone grew by 1.6 GB, but between 2019 and 2021, it accelerated by 5.2 GB

The use of mobile data is expected to continue its steep rise facilitated by both the rising number of smartphone subscriptions and an increasing average data volume per subscription, fueled primarily by increased viewing of video content



1)Western, Central and Eastern Europe

2)Sources: Ericsson, GSMA

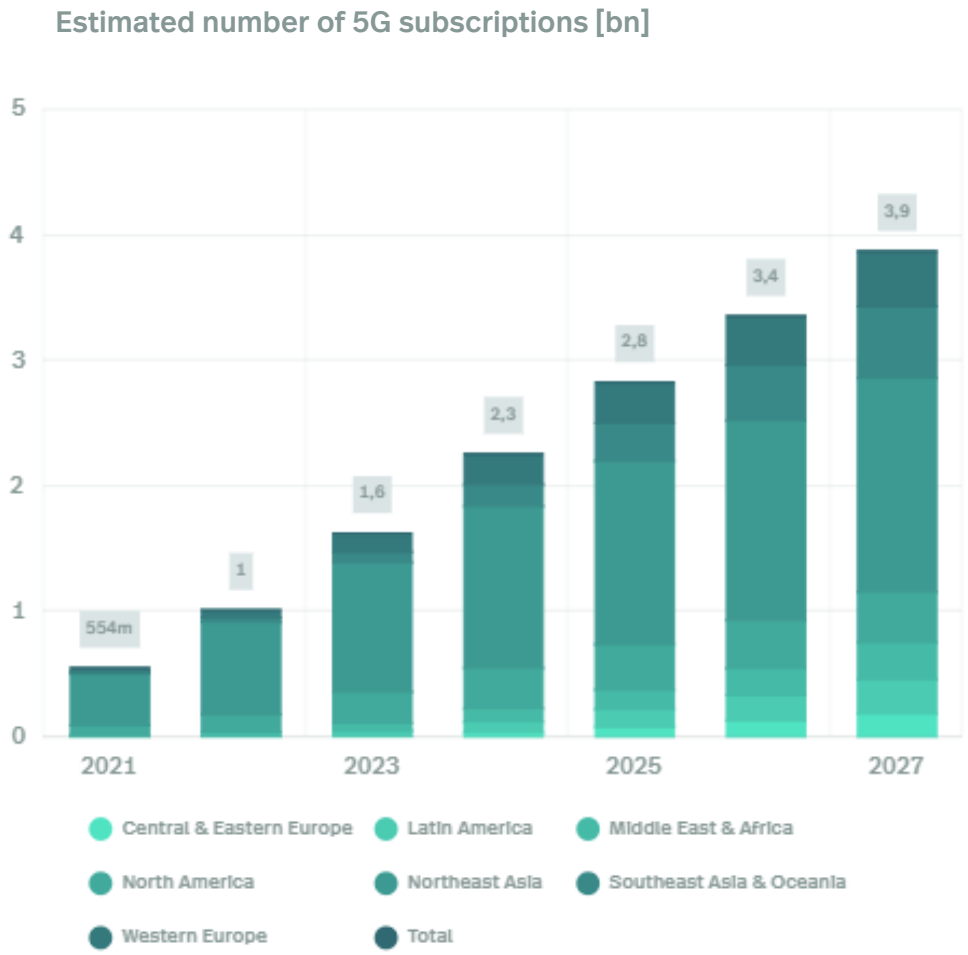
5G is expected to grow steadily in the coming years, with Asia comprising more than half of global 5G subscriptions

The spread of 5G is expected to grow significantly within the coming years, with the number of subscriptions in 2027 set to be 7 times higher than in 2021

Asia and Oceania are investing heavily in the expansion of 5G and are assumed to be the region with the most 5G subscriptions in 2027

The EU aims to provide 5G to every EU citizen by 2030 according to the digital targets of Europe's "Digital Decade". Currently, in broader Europe (including non-EU member states), 64.4 m inhabitants have a 5G connection, thus still leaving a lot of work for the mobile network providers

1)Sources: Ericsson, IE.F

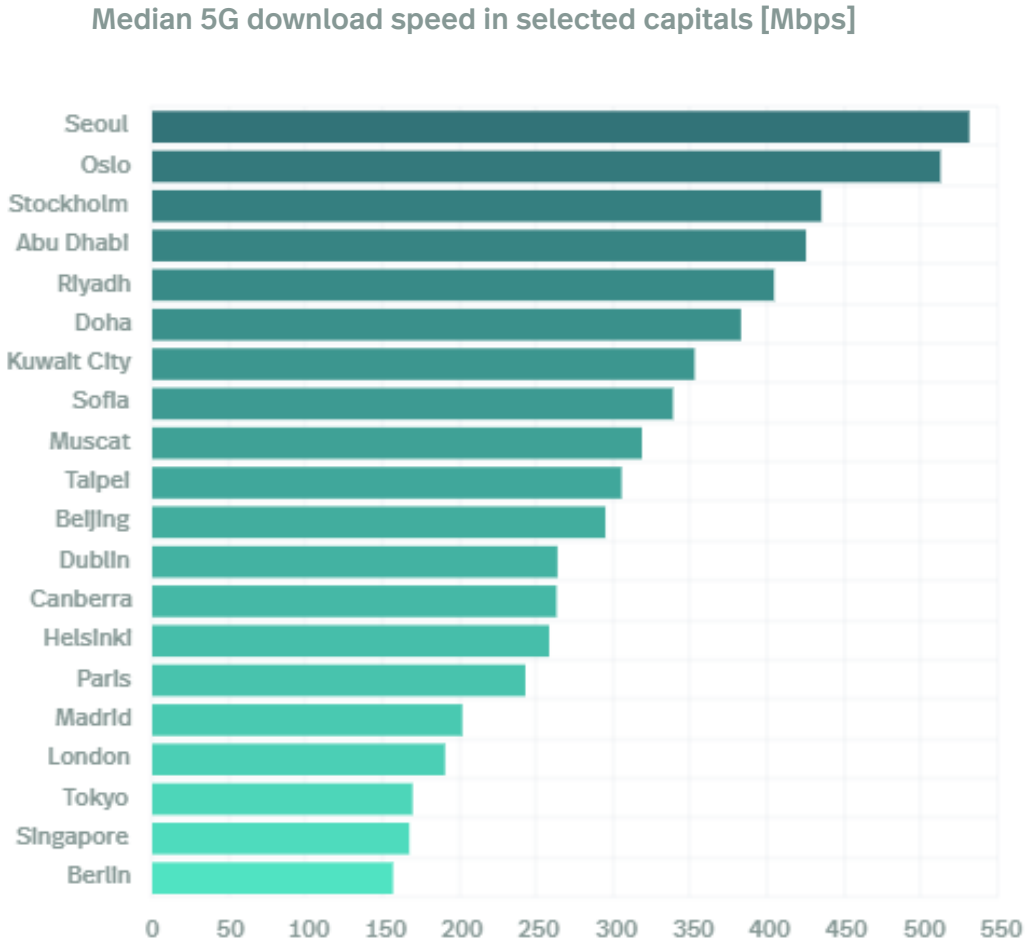


Although 5G promises unprecedented download speeds, the speed varies significantly in different regions

Only three European capitals, namely Oslo, Stockholm and Sofia, make it into the top 10 of the cities with the fastest median 5G download speed – the list is dominated by the capitals in the Middle East

The actual speed of 5G depends on the number of 5G towers deployed because covering a larger area with one 5G tower leads to lower transmission speed. In order to avoid the exorbitant costs of building transmission towers, companies in some countries choose a low frequency range at the expense of transmission speed, but some countries do opt for a higher frequency range

A faster download speed and a shorter latency enables the introduction of a completely new generation of services and applications, such as "on the go" streaming of 4K videos or self-driving autonomous cars



1)Data as of Q3 2021

2)Source: Ookla

The market for public cloud services is forecast to continue its strong growth

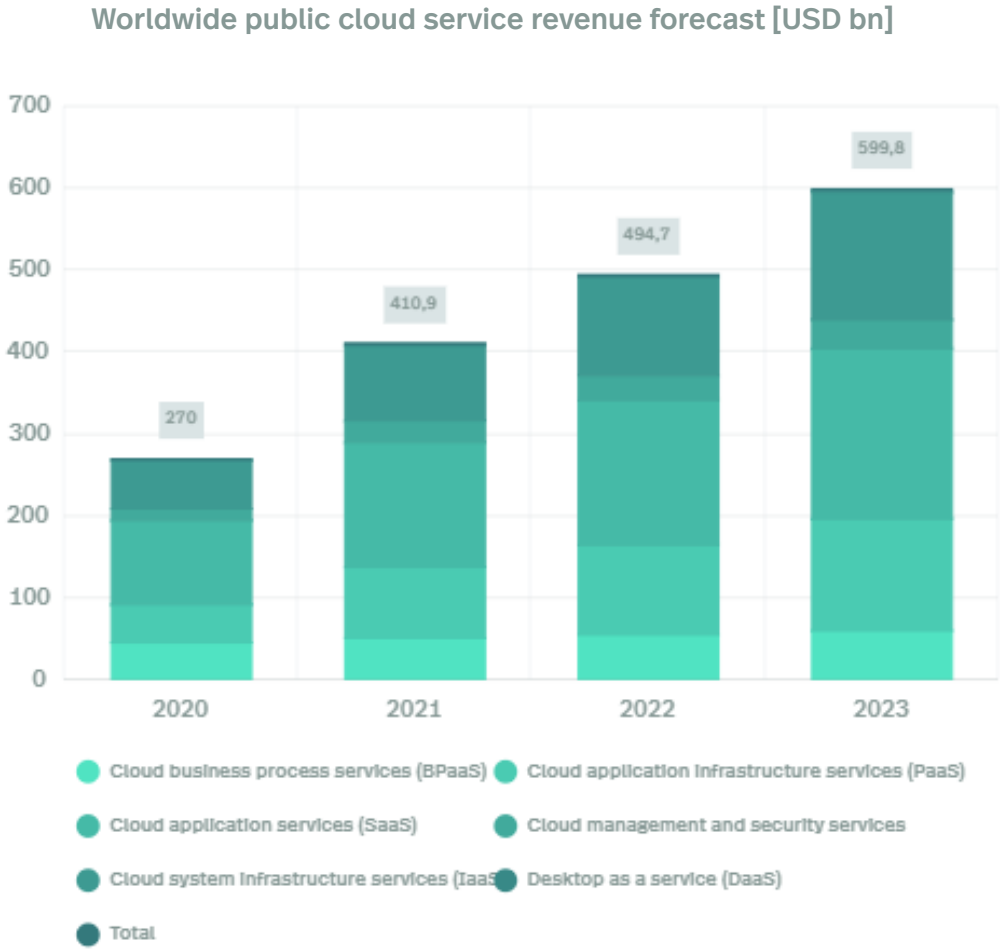
Public cloud computing refers to scalable and elastic IT capacities that are provided as a service to external customers

The market is growing at double-digit rates each year in each sector, with the fastest increase in the PaaS sector (43% CAGR)

Application services, also known as software as a service (SaaS), constitute the largest segment of the public cloud computing market

However, cloud application infrastructure services (PaaS) is estimated to be the public cloud computing segment with the highest growth rates (about 43% compound annual growth rate between 2019 and 2023)

1)Source: Gartner



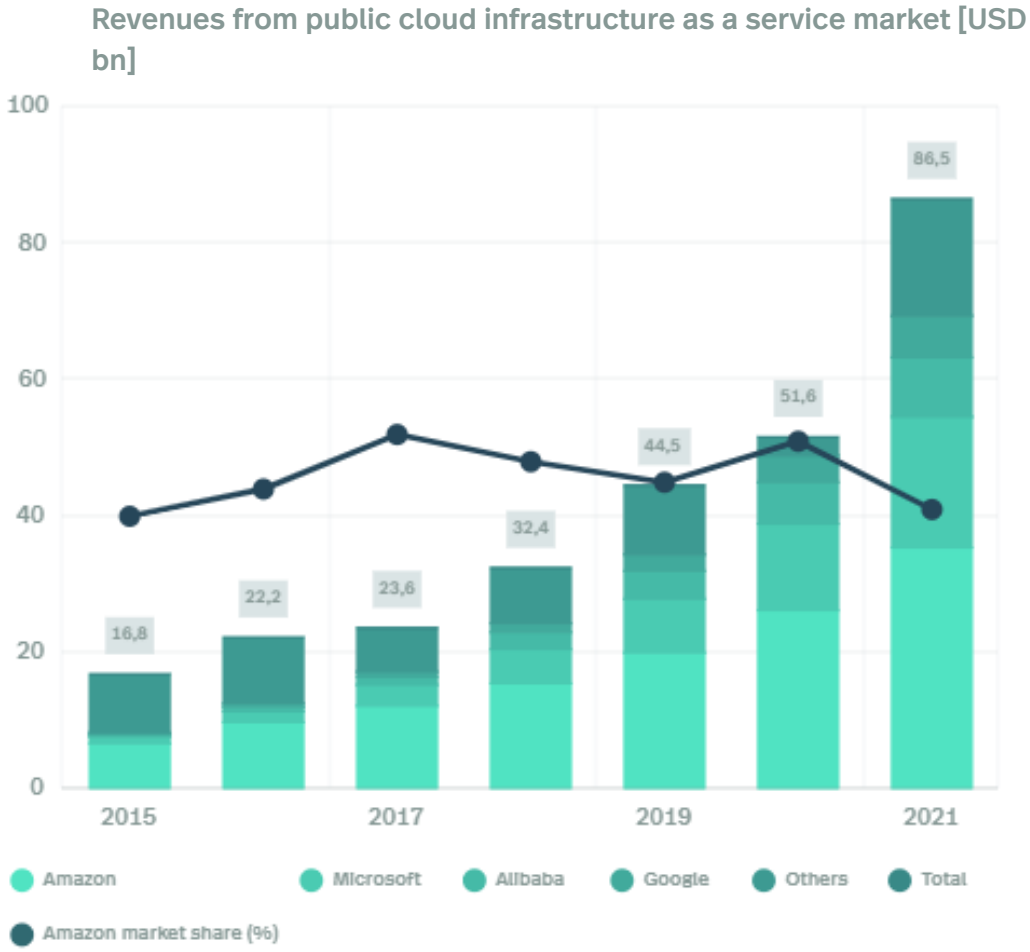
Cloud infrastructure services are dominated by market players from the US and China

The dominance of foreign providers poses the risk of European public cloud data potentially becoming subject to non-European
jurisdiction, inducing data protection issues

The US Clarifying Lawful Overseas Use of Data (CLOUD) Act, for example, requires US cloud service providers to preserve, back up or disclose customer data if requested to do so by federal law enforcement authorities – regardless of where the data in question are stored

This means that data stored on a European server that is operated by a US cloud service provider might be transferred to US authorities – resulting in a possible violation of European data protection rules

The EU and US plan a new data agreement, but experts are unsure if it will solve the underlying problem



1)Source: Gartner

02 - Key Takeaway

Cloud computing is the backbone of digitalization. A competitive and innovative cloud market is therefore paramount. The planned launch of the Industrial Cloud IPCEI is an important step towards a European cloud infrastructure for the future

03 The internet economy needs innovation

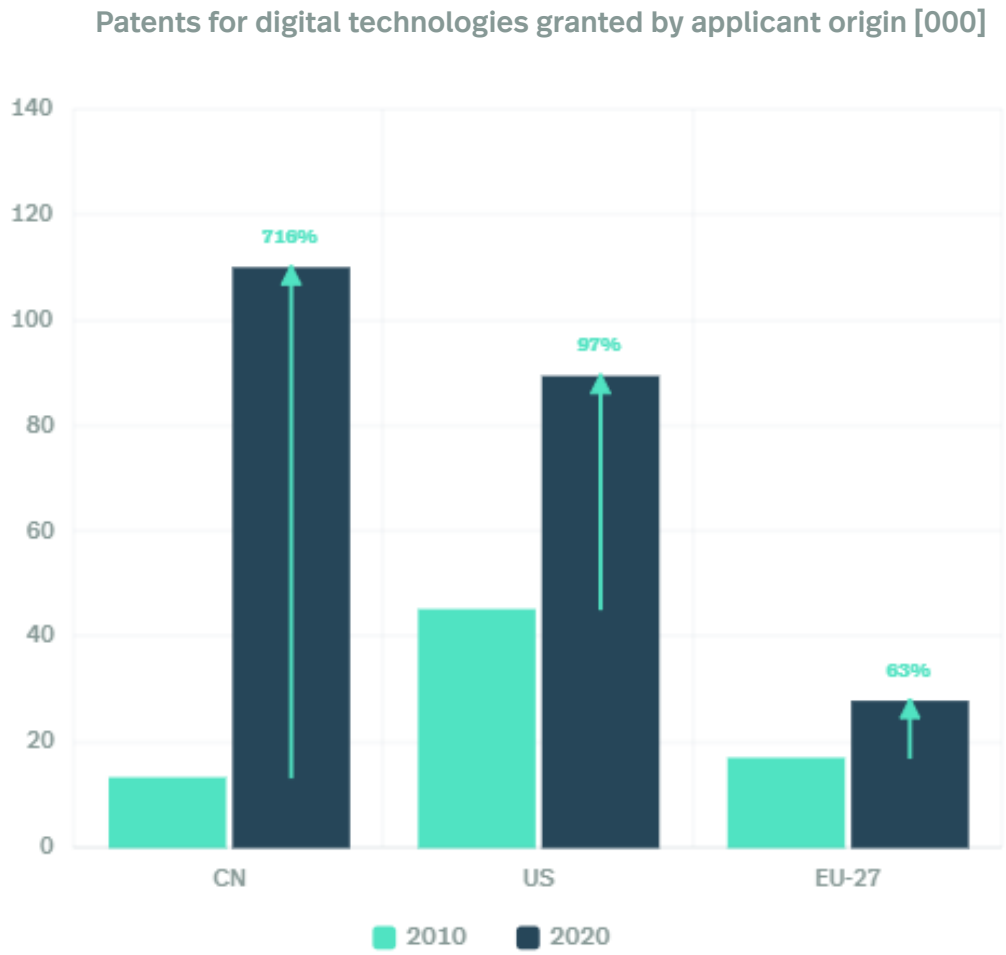
Foundations of the internet economy – Part II

The US and China have extended their lead in patent filings for digital technologies ...

The yearly number of patents granted to applicants from the US rose by 97% between 2010 and 2020 – concurrently, the number of patents granted to Chinese applicants rose by an extraordinary 716%

However, the increase in patents granted to Chinese applicants partly reflects the strong incentives the Chinese government put in place to boost the number of patents

Europe trails the two regions in terms of growth rate (+63%) as well as in absolute numbers



1)Audio-visual technology, digital communication, computer technology, IT methods for management

2)EU-27, Norway and Switzerland

3)Source: World Intellectual Property Organization

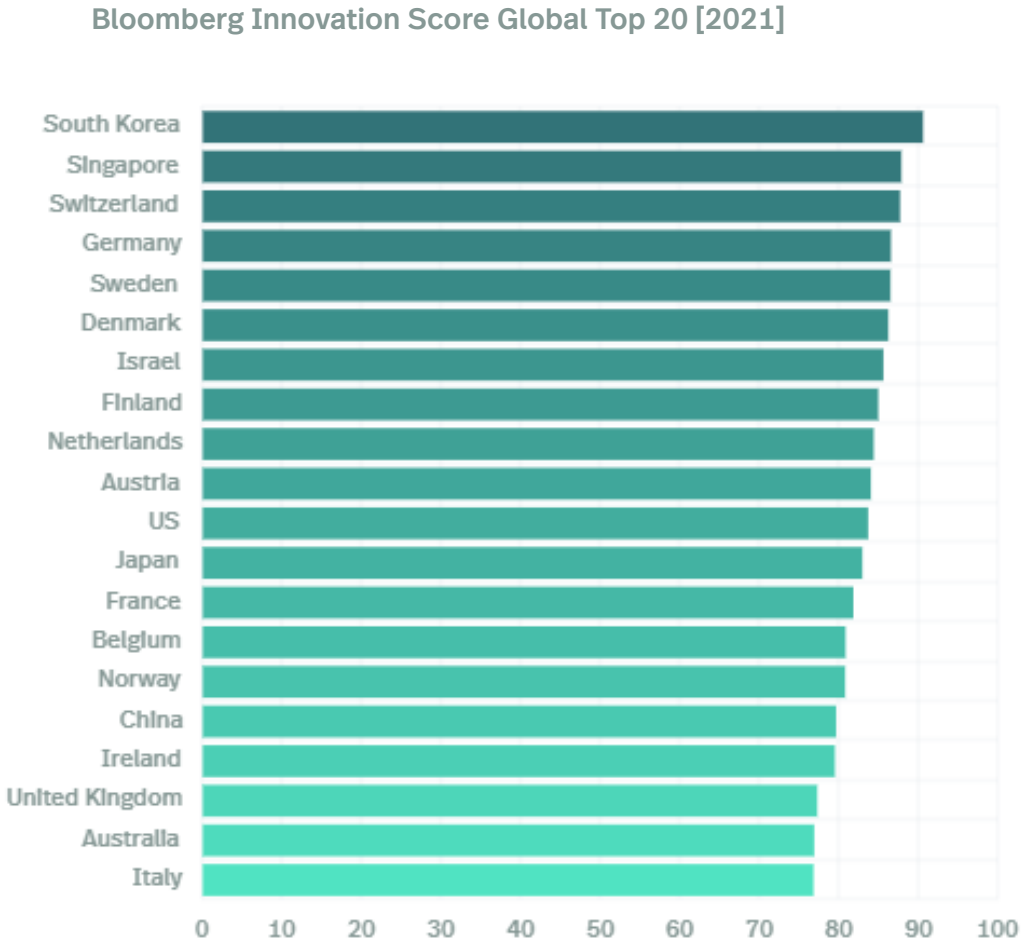
... but innovation capacity is more than just patents: European countries score high on Bloomberg's Innovation Index

Each year Bloomberg ranks 66 countries across the globe by their overall innovation capacity

Each country is scored on a 0-100 scale based on seven equally weighted metrics: research & development intensity, manufacturing value added, productivity, high-tech density, tertiary education efficiency, research concentration, patent activity

In 2021, there were 13 European countries among the global top 20

1)Source: Bloomberg

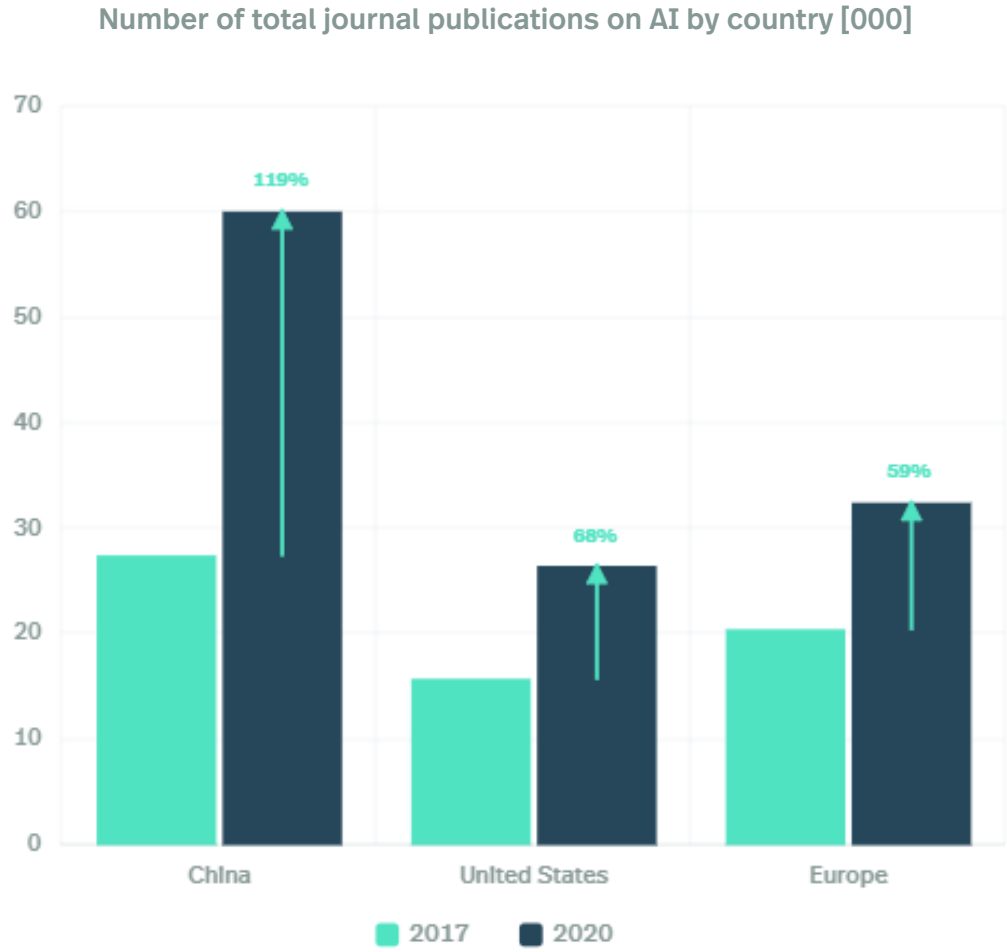


China has an edge in AI research, one of the most important and contested fields of innovation

China has become by far the leading country in AI research in terms of publishing journal papers, and has significantly increased the gap to the EU and the US. The US, on the other hand, has been able to narrow the gap with the EU

This increase in China can be explained by the fact that government funds have flowed into the field, thus promoting scientific development

1)Source: Artificial Intelligence Index Report 2022



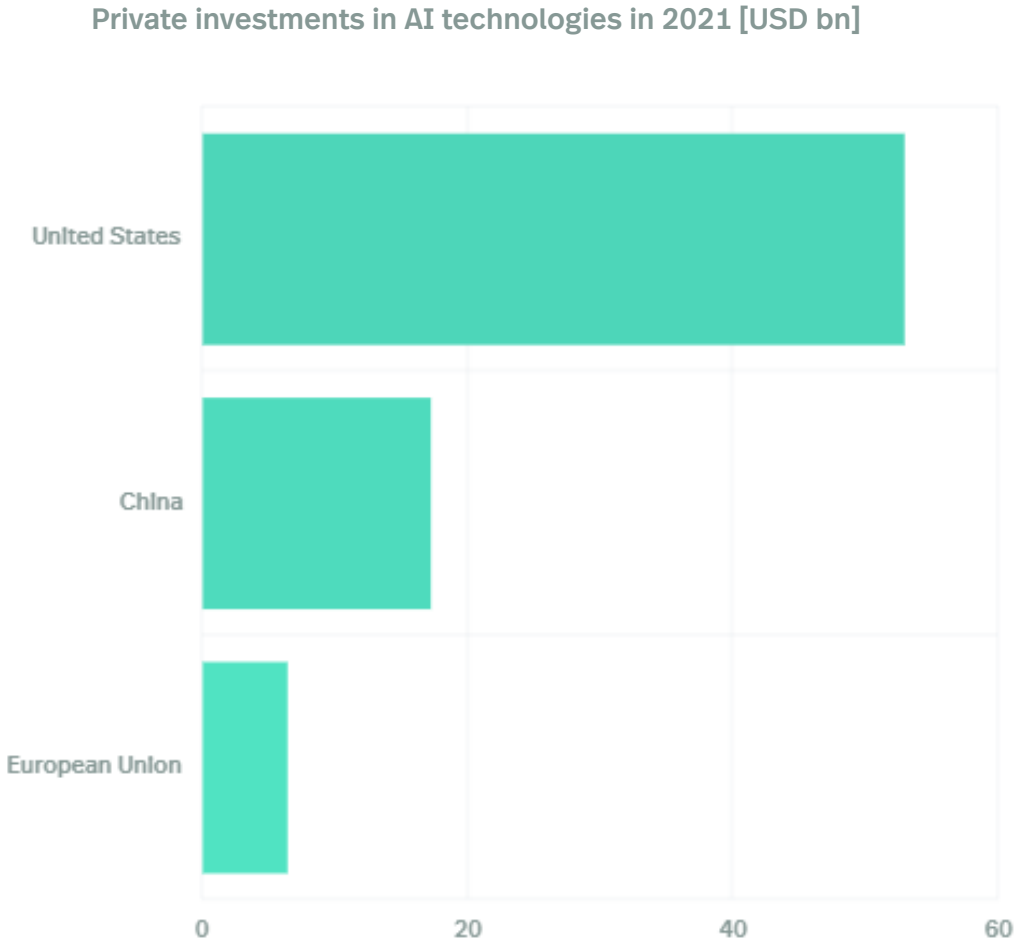
When it comes to private investments in AI, the US was able to extend its lead – The EU is catching up with China

The US is the clear leader in terms of private AI investments. In 2021, private investments in AI technologies were eight times higher in the US than in the European Union. Looking at the trend over time, this gap has increased compared to 2017

However, the gap in private investments between China and the EU is slowly closing, with the EU's investments having grown faster than those in China

Given the strong AI investments in the US, it is not surprising that 70% of AI experts work for Google, Facebook, Microsoft or Amazon

1)Source: Artificial Intelligence Index Report 2022

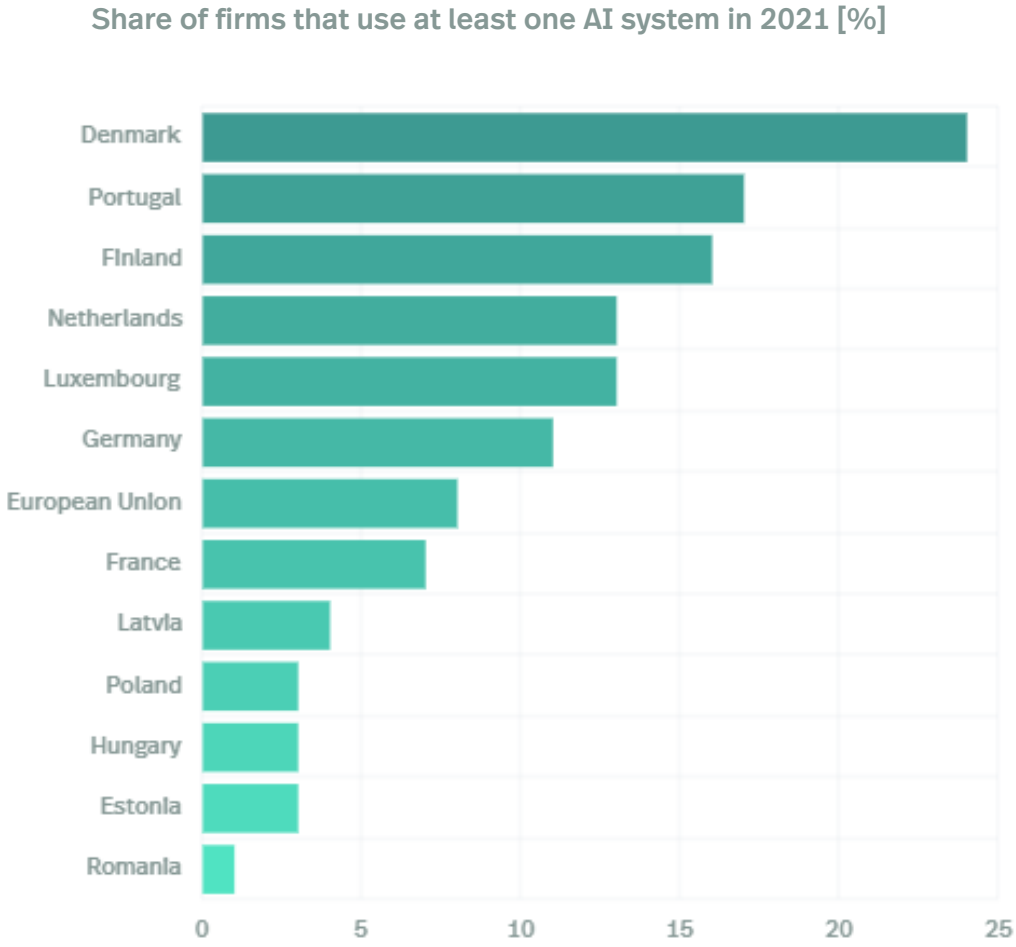


European countries have a long way to go to reach their goal of 80% of companies using AI by 2030

In 2021, only 8 % of enterprises in the EU, with 10 or more employees and self-employed persons, used at least one AI system – up from 7% a year ago

It's no surprise that Denmark is leading the way in Europe when it comes to AI: Among Europeans, Danes have the most positive view on robotics and AI, and they rank second in Europe when it comes to mastering the skills that are required for an AI transition. Moreover, Denmark is at the forefront of research in several AI sub-disciplines

According to the Digital Decade Plan, the EU aims to reach an EU-wide share of 80% of firms using AI. Digital Europe program funding (2021-2027) therefore provides EUR 2.5 bn to foster AI



1)Source: Eurostat

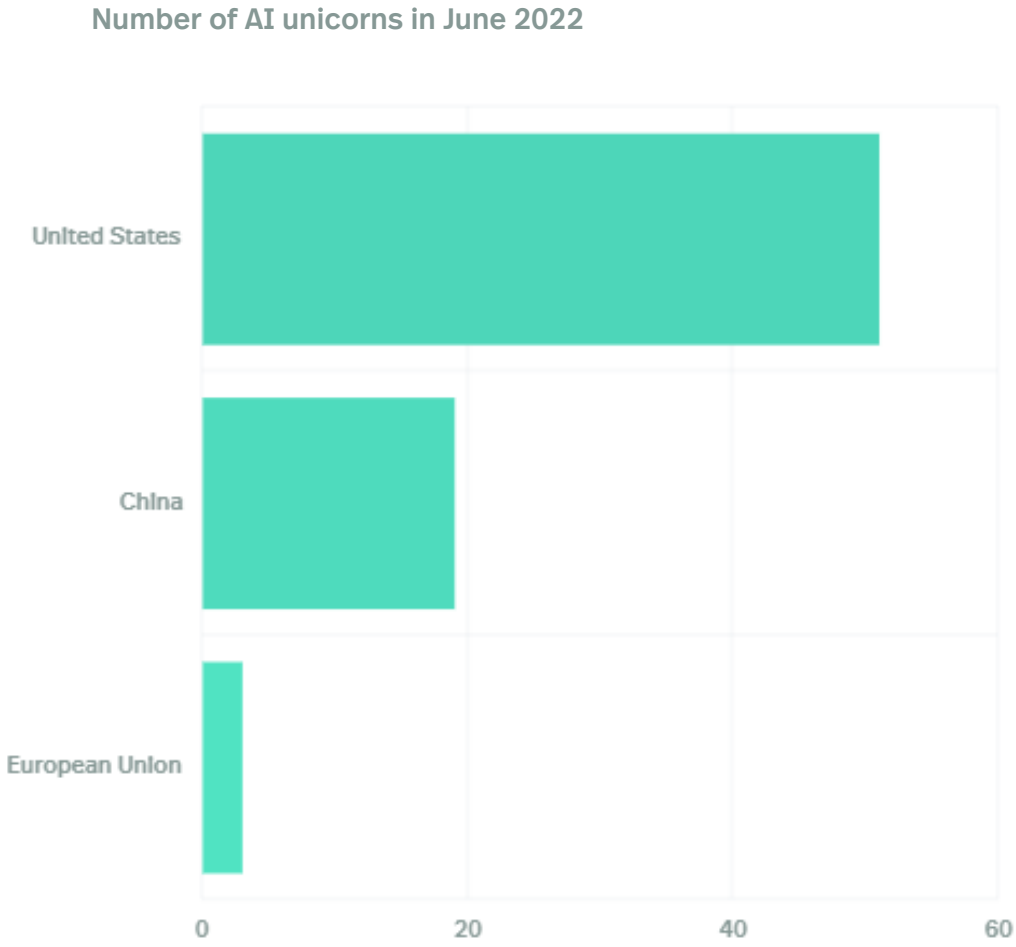
Unlike in the US and China, high valuations for AI startups remain the exception in Europe

Unicorns are startups with a market valuation of at least USD 1 bn. There are 87 AI unicorns in the world, with a market value of approximately USD 337 bn

More than half of AI unicorns can be found in the US. In the EU, there are only three AI unicorns, two of which are located in France and one in Estonia

Approximately 80% of the total Chinese valuation is accounted for by one unicorn, Bytedance (USD 140 bn)

1)Source: CB Insights

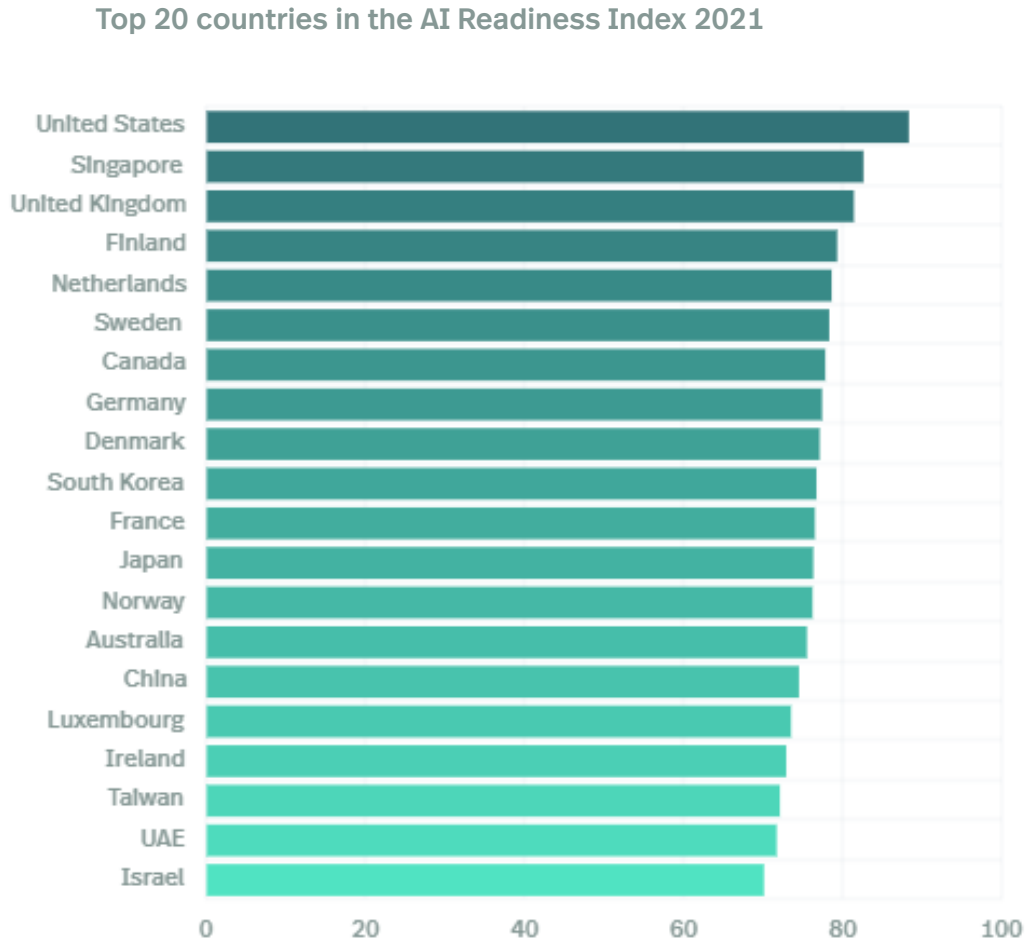


However, the AI Readiness Index indicates that European countries are well prepared for rapid adoption

When it comes to the AI Readiness Index, ten European countries are listed in the top 20, demonstrating that Europe is largely ready to implement AI. However, further investments are needed to increase AI adoption

The index measures the readiness of countries by considering three main pillars: government, technology sector, and data and infrastructure. Each pillar consists of three sub-dimensions

1)Source: Oxford Insights



When it comes to responsible AI adoption by governments, Europe is even in the lead

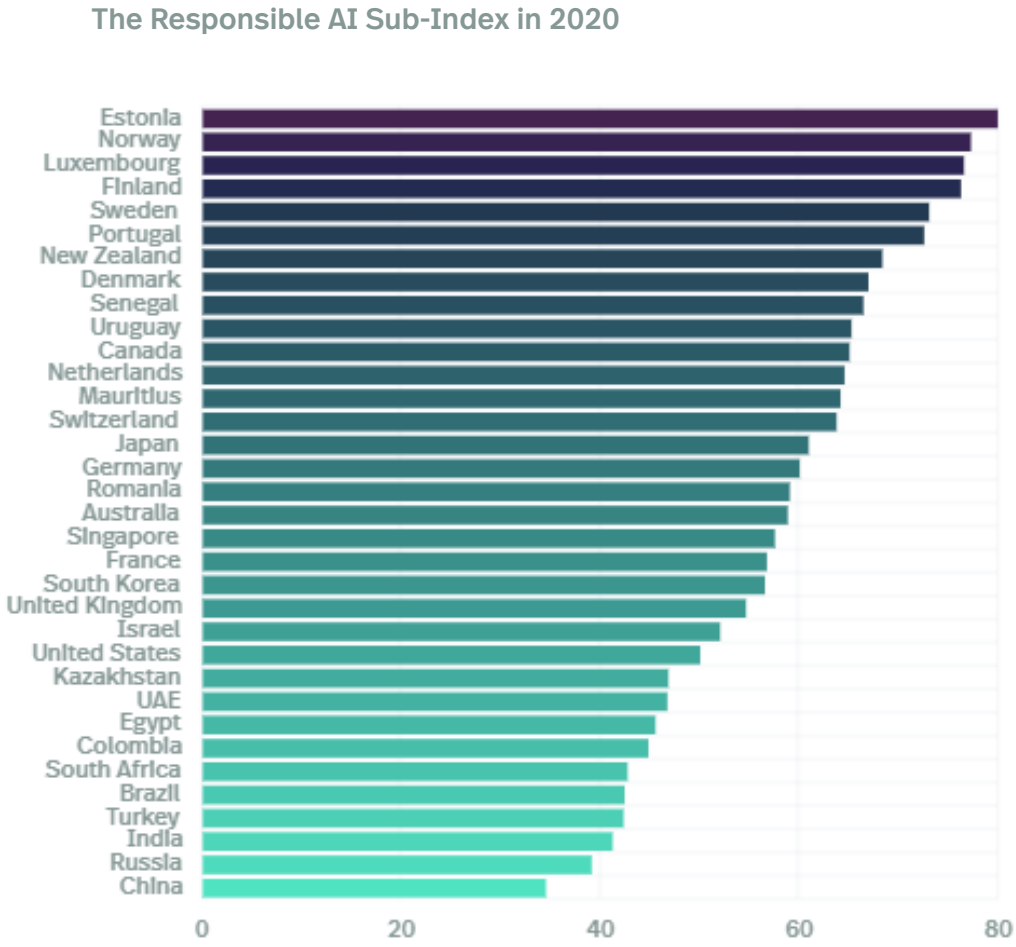
The Responsible AI Sub-Index measures how responsibly governments make use of AI

Four measures are considered: inclusivity, accountability, transparency and privacy

Only European countries account for the top 6 in the ranking, demonstrating strong performance when it comes to respecting individual digital rights

The US, as the most successful nation in AI in economic terms, achieved a score of just 50.0, well below the average

However, it remains to be seen whether Europe's lead in the responsible government use of AI also translates into a competitive advantage, for example in respect of privacy tech



1)Sources: Oxford Insights, iconomy

03 - Key Takeaway

In terms of patents, Europe lags behind the US and China. While Europe's overall innovative potential is generally high, the continent must do more to convert these innovations into market successes

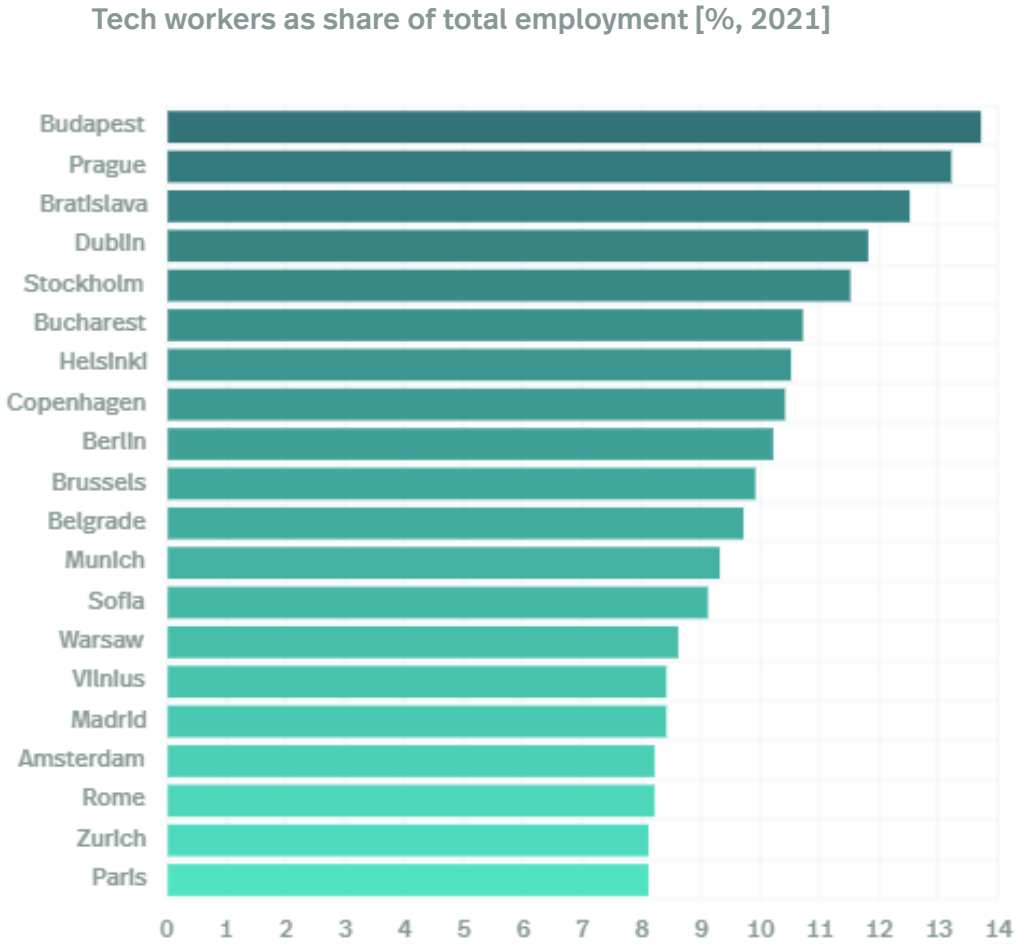
04 Innovation requires Talent

Foundations of the Internet Economy – Part III

Europe has no single equivalent to Silicon Valley – Instead, there are many tech clusters spread across the continent

The largest European tech hubs, as defined by the 20 regions with the highest share of employees in knowledge-intensive services, are distributed across 19 countries in all parts of the continent

While the share of tech workers alone is not what creates digital products, tech workers do create regional ecosystems that foster creativity and innovation



1)Regions correspond to NUTS2 (for London, several NUTS2 levels have been merged for reasons of clarity); tech workers are employees in knowledge-intensive high-technology services as defined by NACE codes 59-63 and 72

2)Source: Eurostat

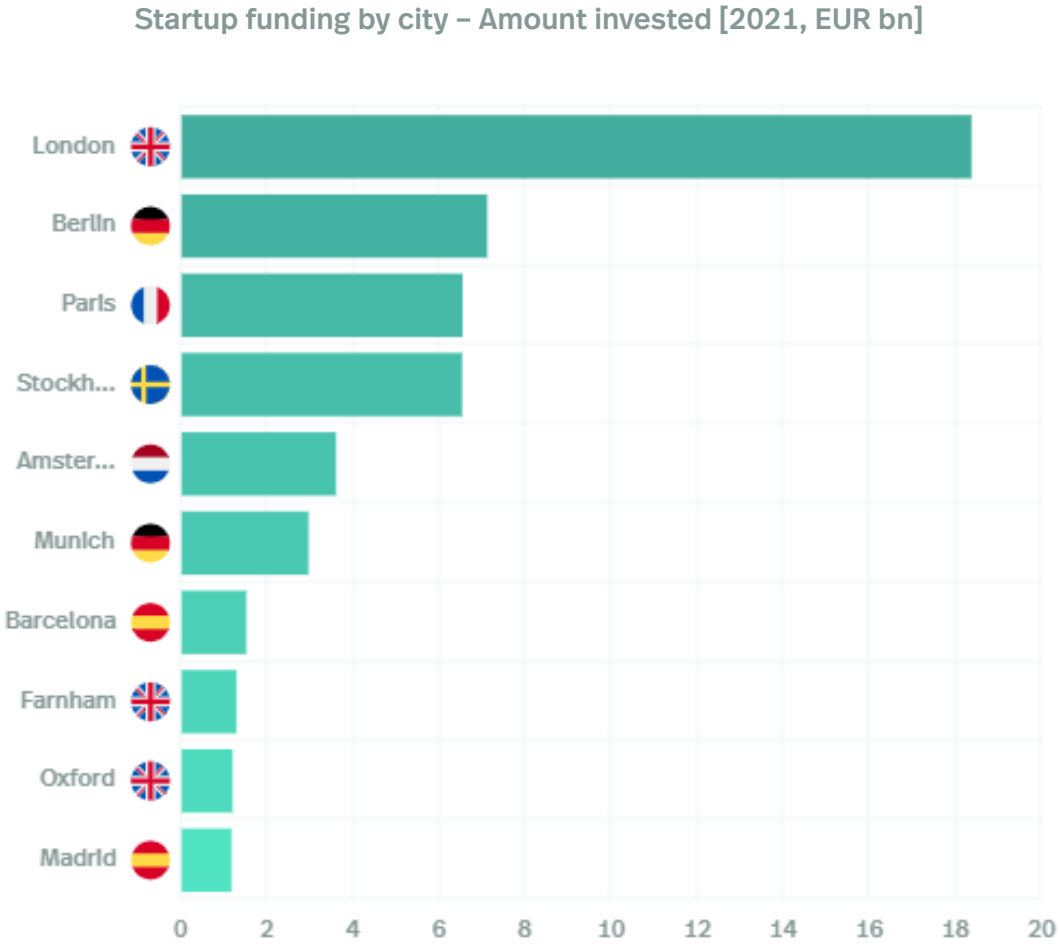
This geographic diversity also manifests itself in the distribution of major startup clusters

London-based startups received the highest amount of funding in 2021

The list of top 10 cities with the highest startup funding in 2021 highlights the fact that Europe's major startup clusters are distributed across the continent. However, none of the major startup clusters are located in Eastern Europe

Most startup clusters have grown in the vicinity of highly ranked universities

1)Source: State of the European Tech Report 2021



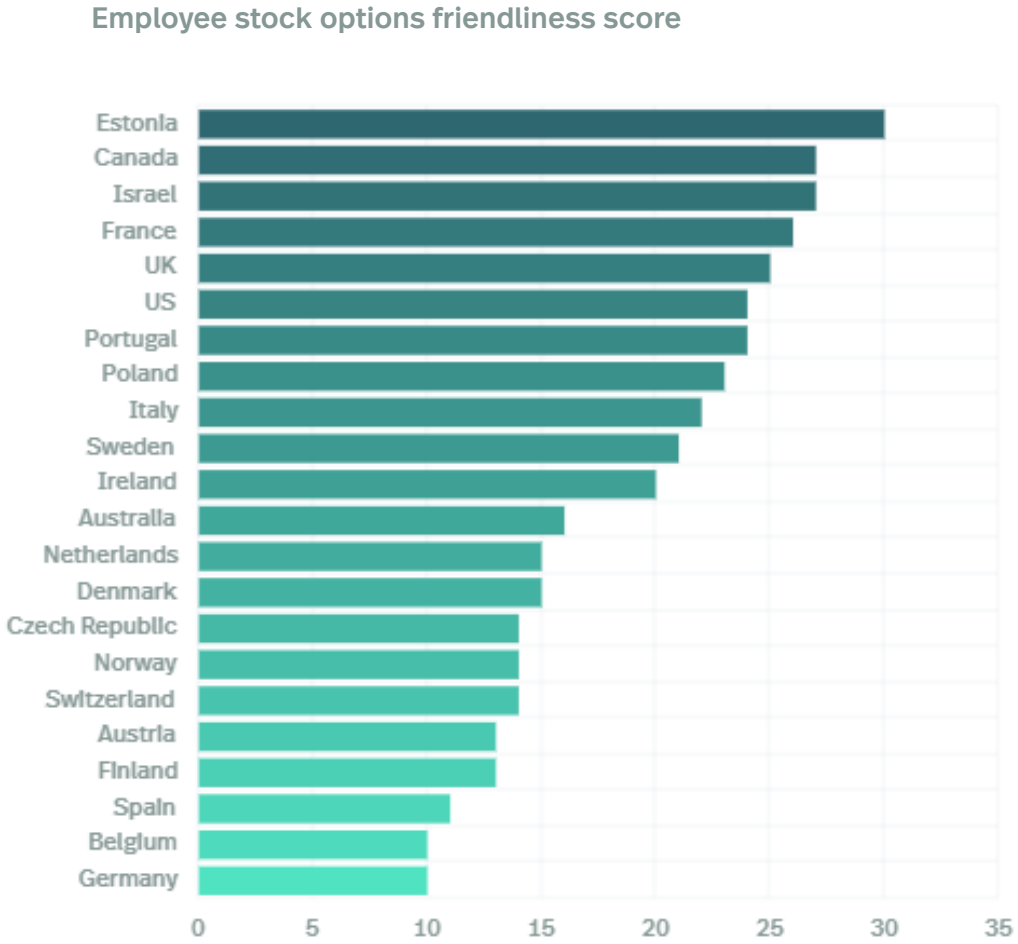
Employee stock option programs help startups attract talent, but too few countries in Europe have a supportive regulatory framework

In the past few years, startups have been catching up to established firms when it comes to compensation. They attempt to compete with traditional firms by offering good working conditions and high-impact tasks

Many startups compensate their employees by offering stock options that give the employees the right to buy the company's stock at a specified price

The employees benefit if the company's value increases and its stocks rise above the exercise price

However, national regulation often makes the implementation of employee stock option programs very difficult – especially in Spain, Belgium and Germany



1)Last access to the underlying source: July 2022

2)Source: Yale Insights, Index Ventures

04 - Key Takeaway

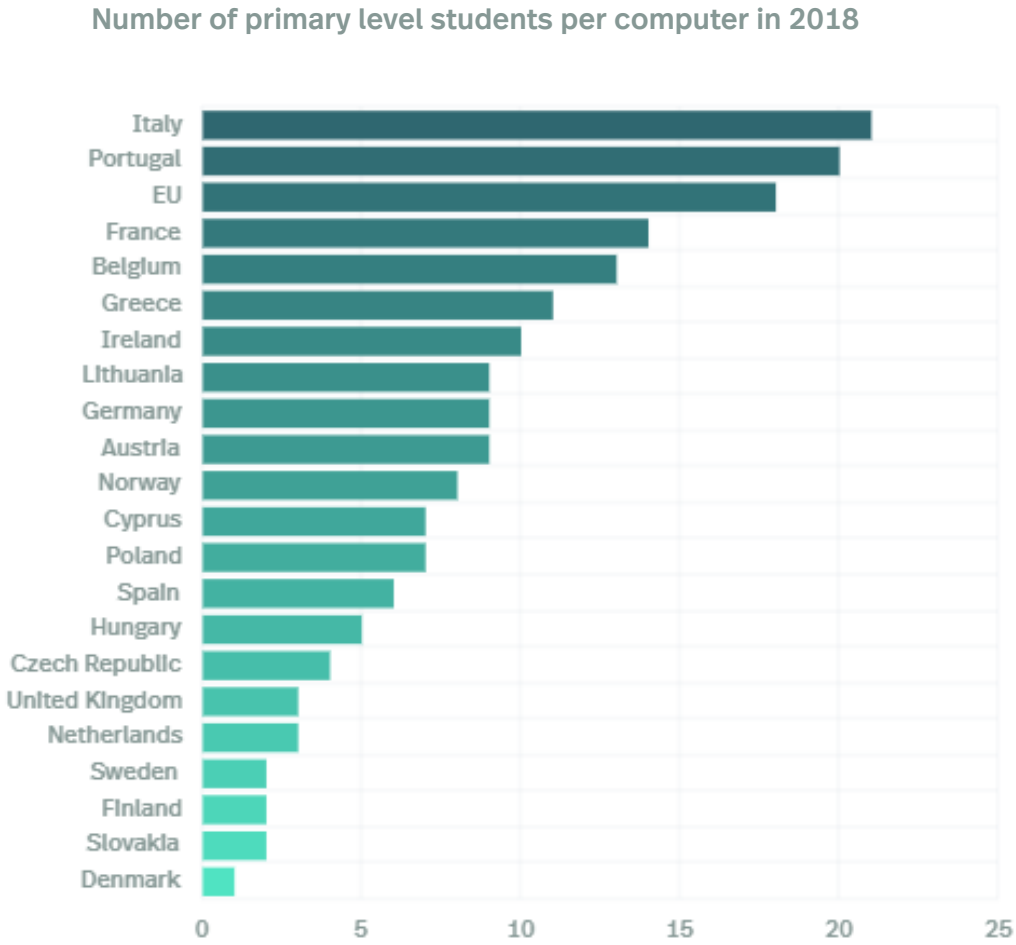
There are many tech clusters with lots of talent across Europe. However, attracting talent with employee stock option programs is difficult in many countries

The digital divide can also be seen in the education systems of different European countries

A north-south divide can be observed in the number of primary level students per computer. While the Mediterranean European countries are relatively poorly equipped with computers, Nordic countries demonstrate a high level of equipment

The digital divide is supposed to be closed in schools through the EU Digital Education Plan (2021-2027). The goal of this plan is, among other objectives, to provide the infrastructure for a more efficient digital school system. Furthermore, it aims to strengthen the digital skills of both educators and students

1)Source: European Commission



However, in a global comparison of digital inclusion, Europe ranks in the middle of the pack

The Roland Berger Digital Inclusion Index ranks countries according to their level of digital inclusion based on four key levers:

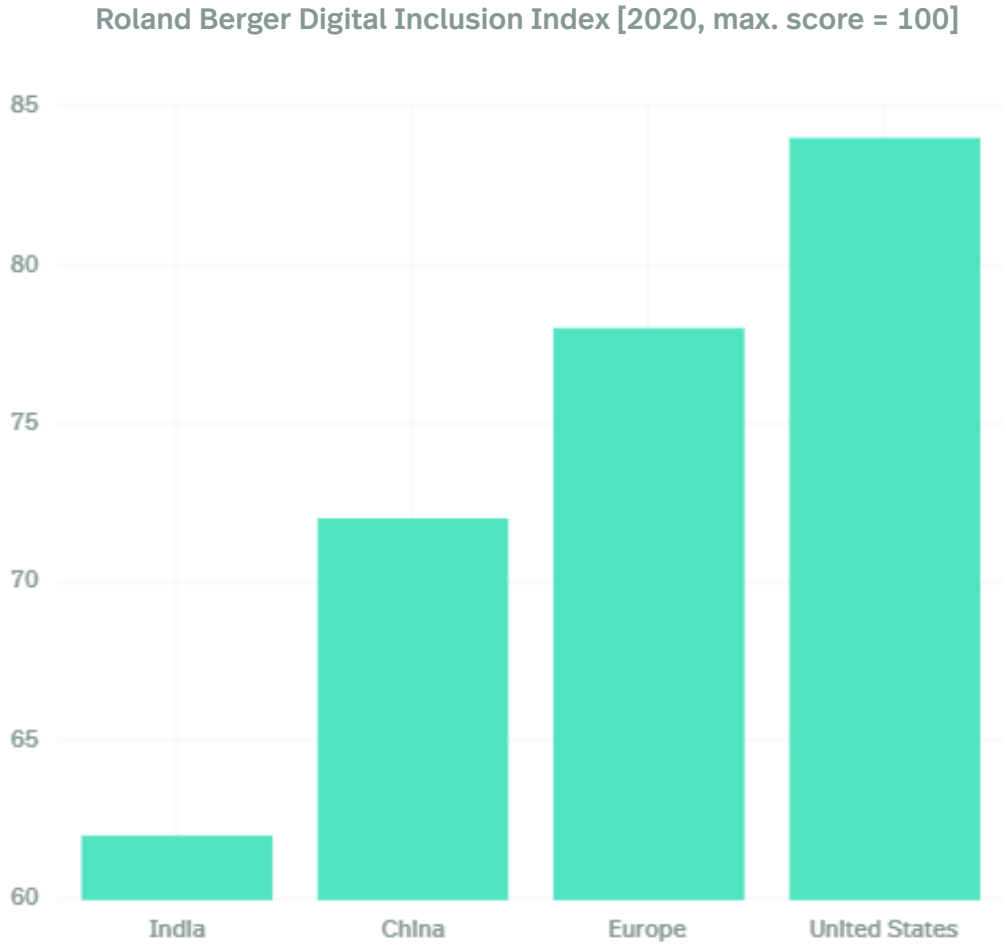
Accessibility measures the availability of digital services

Affordability takes into account both the price of typical tariffs and the ownership of digital devices

Ability is an indicator based mainly on education level

Attitude measures, among others things, the technology adoption of companies

1)Source: Roland Berger



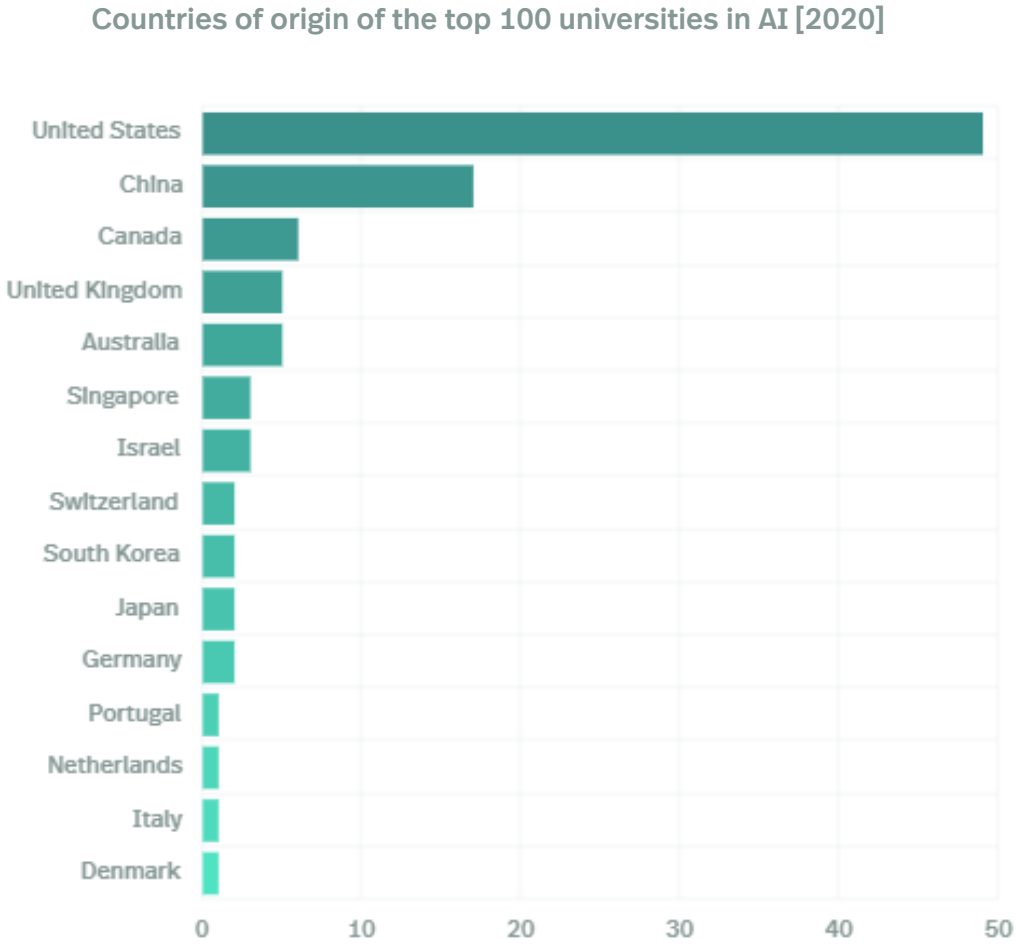
When it comes to the top universities for AI-related research, Europe is trailing both the US and China

The ranking is based on the number of academic papers published on topics related to artificial intelligence

Almost half of the top 100 universities are located in the US, followed by China and Canada

Only 13 of these universities are in Europe and of these, only 6 are in the EU

1)Source: CSRankings



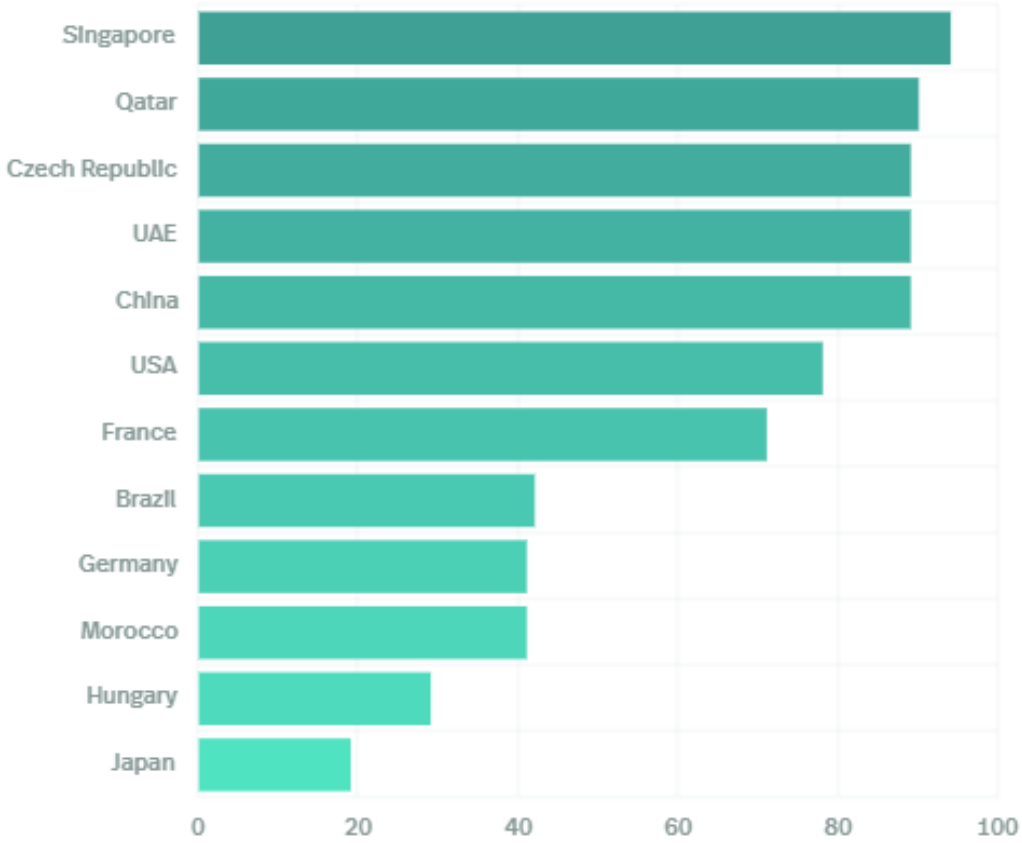
ICT skills of tomorrow's researchers depend on teachers' ability to convey appropriate tools and methods

In 2020, the OECD asked school principals to estimate whether teachers are appropriately trained to teach digital skills

While four of the five countries with the highest results are located in Asia, Germany as Europe's largest economy is among the worst performers

1)Source: OECD

Share of school principals who estimate digital training of teachers to be good [2020, %]



Not all European countries provide a separate school subject to teach digital skills

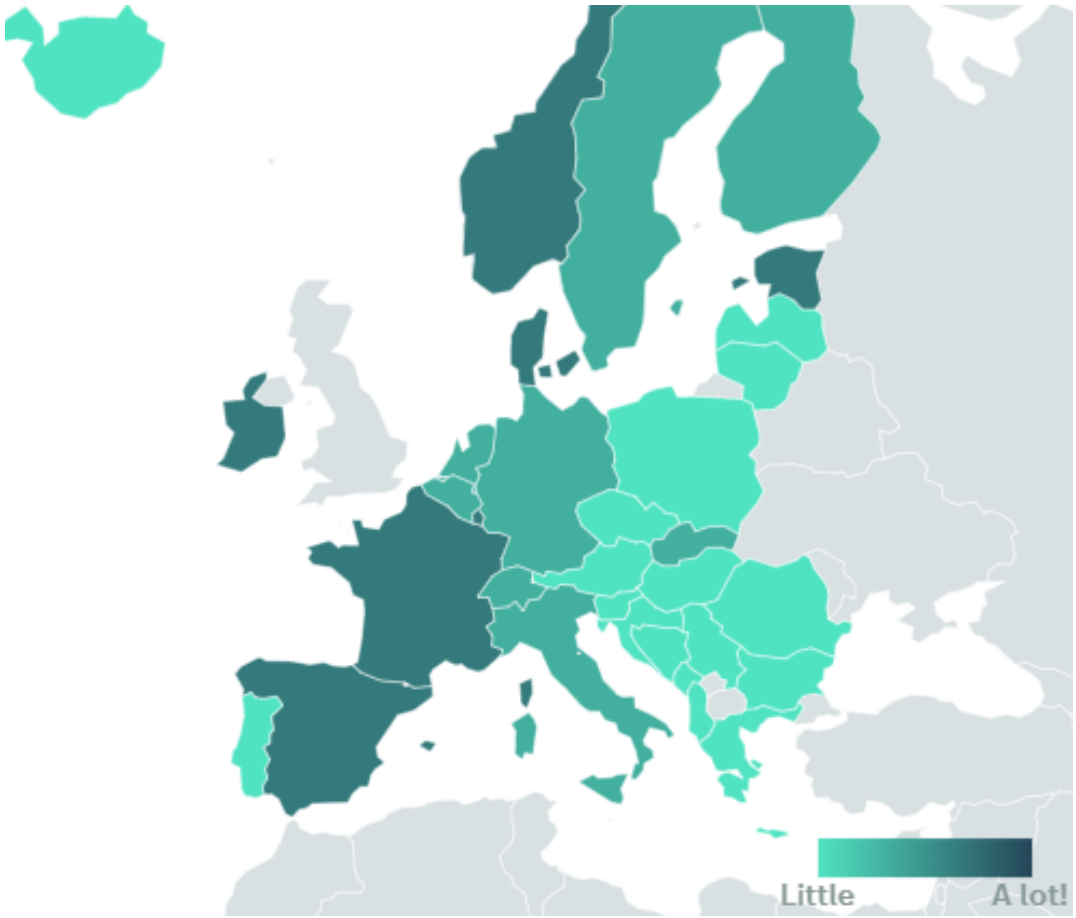
While a mandatory school subject on digital skills is not a silver bullet to ensure world-class ICT skills, it can help to raise interest in IT-related topics among students at an early age

This in turn regularly translates into a higher proportion of future students taking ICT subjects

1)1 = Compulsory subject, 2 = Integrated in another subject, 3 = Optional subject, 4 = Mixed

2)Source: European Commission

Status of school subjects on digital skills [2019]

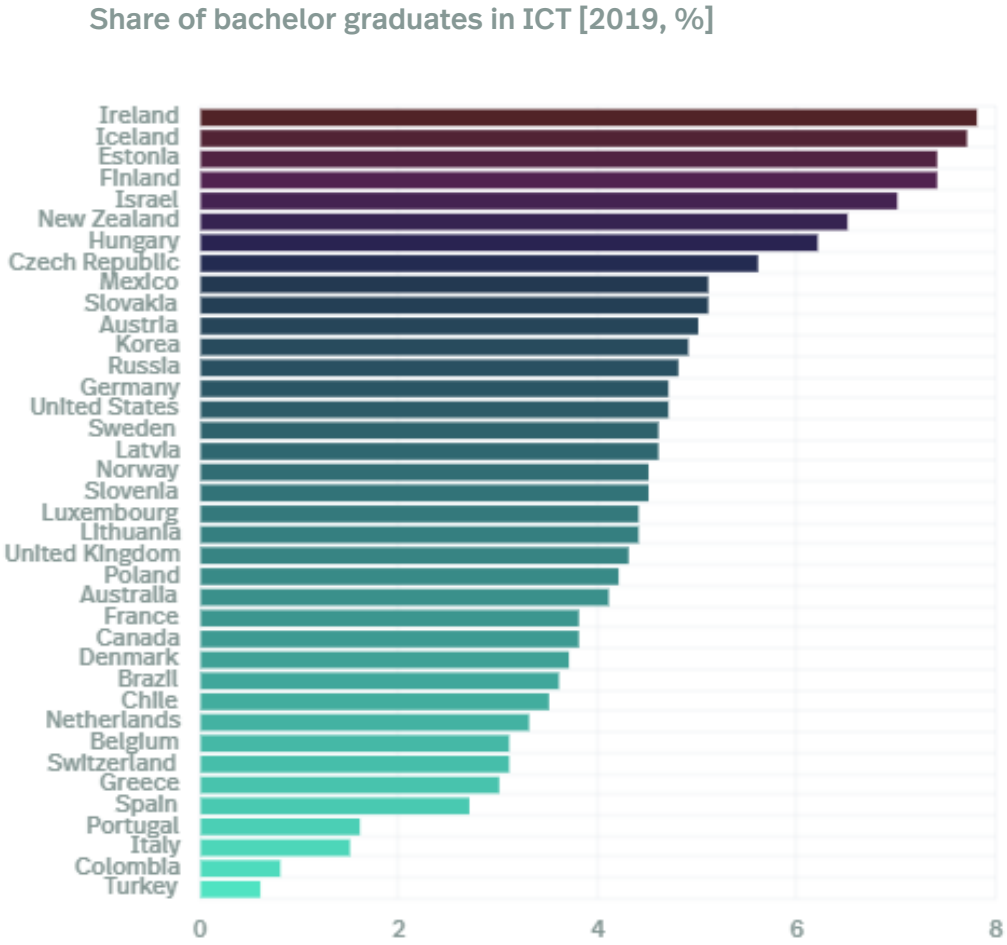


Especially the small European economies can boast a high share of bachelor graduates in ICT

The share of bachelor graduates in ICT (which includes subjects such as informatics, information and communication technologies or computer science) seems to correlate to some extent with children being taught digital skills

Four of the top five are European countries and three out of those four provide a separate subject for digital skills, either compulsory or optional

1)Source: OECD



04 - Key Takeaway

There are many tech clusters with lots of talent across Europe. However, the digital divide between Europe's citizens should be bridged to ensure equal opportunities across the bloc

05 Startups are a central part of the internet economy

Foundations of the internet economy – Part IV

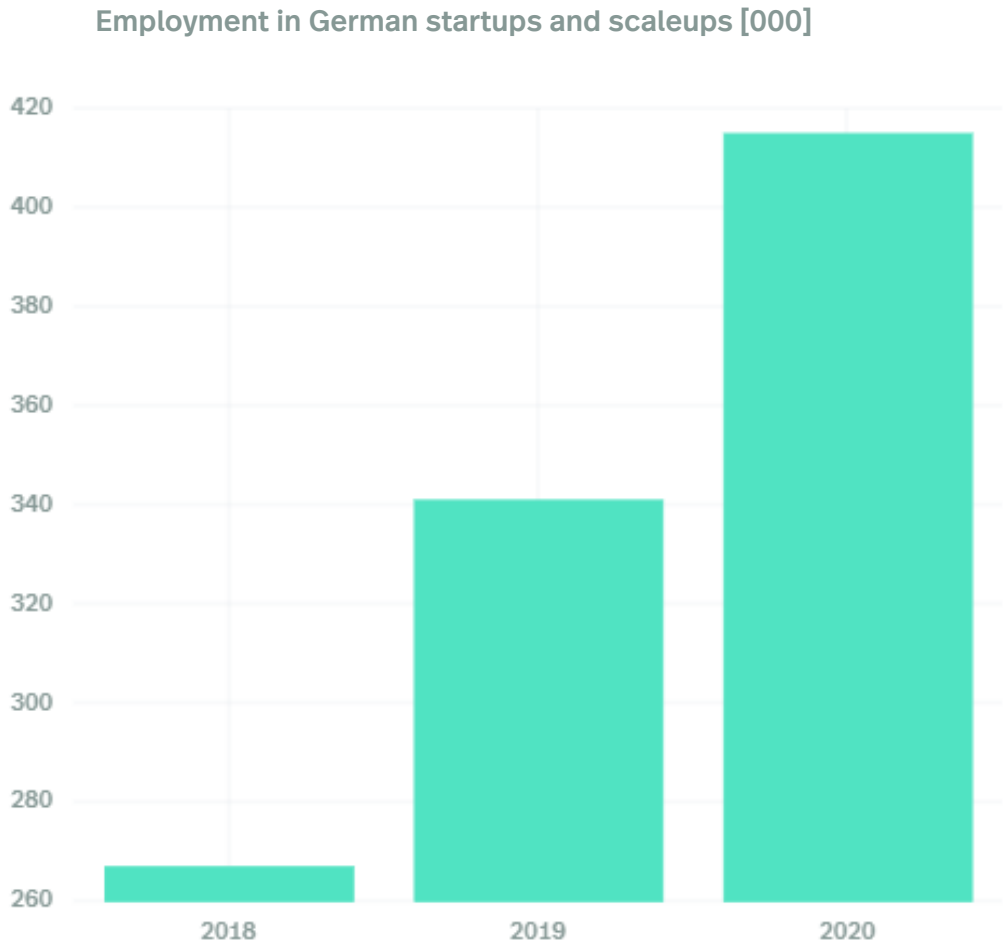
Startups and scaleups have proven to be important job engines – And they do so at a much faster pace than established companies

Startups have become genuine job engines in recent years, as a joint study by IEF, Roland Berger and others shows

While large companies, especially those from the DAX, have provided for only moderate job growth within Germany in recent years or have even cut jobs, the number of jobs in startups has increased by 55% since 2018

Even in the coronavirus year 2020, when few established companies dared to hire people, startups proved to be growth drivers in the labor market, creating more than 70,000 jobs

By comparison, employment among DAX30 companies rose by just 1.3% between 2018 and 2019, and fell by 2.2% between 2019 and 2020 due to the pandemic



1)The study cited can be found by searching "Economic miracle 2.0?"

2)Sources: Dealroom, Roland Berger

Startups also create jobs beyond the startup scene as the German example reveals – There are indirect and induced job effects

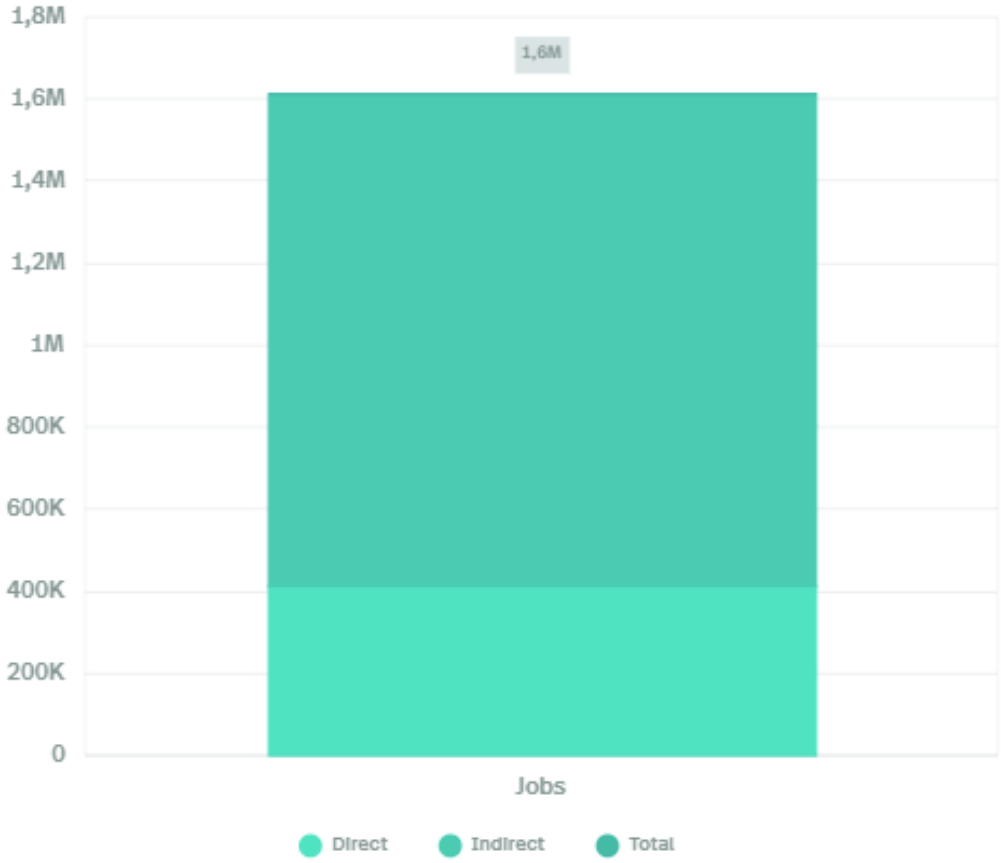
In addition to the jobs that startups create within their own ranks, they also indirectly create jobs for suppliers by demanding their products and services

In addition, the employees of startups and suppliers also act as demanders on the overall market by consuming everyday items – This is another way in which startups create induced job effects

Studies from the US indicate that startups already provide a job multiple of 4-5. This means that for every job created in a startup, 4 to 5 jobs are created in the overall economy

Since the German and European labor markets are set up differently than the US labor market, we assumed a more conservative multiple of 3 – which for Germany would mean that startups provide up to 1.6 million jobs

Estimate of employment effects by German startups and scaleups1)



1)Startups and scaleups that were founded from 2005 onwards, have at least two employees and are headquartered in Germany

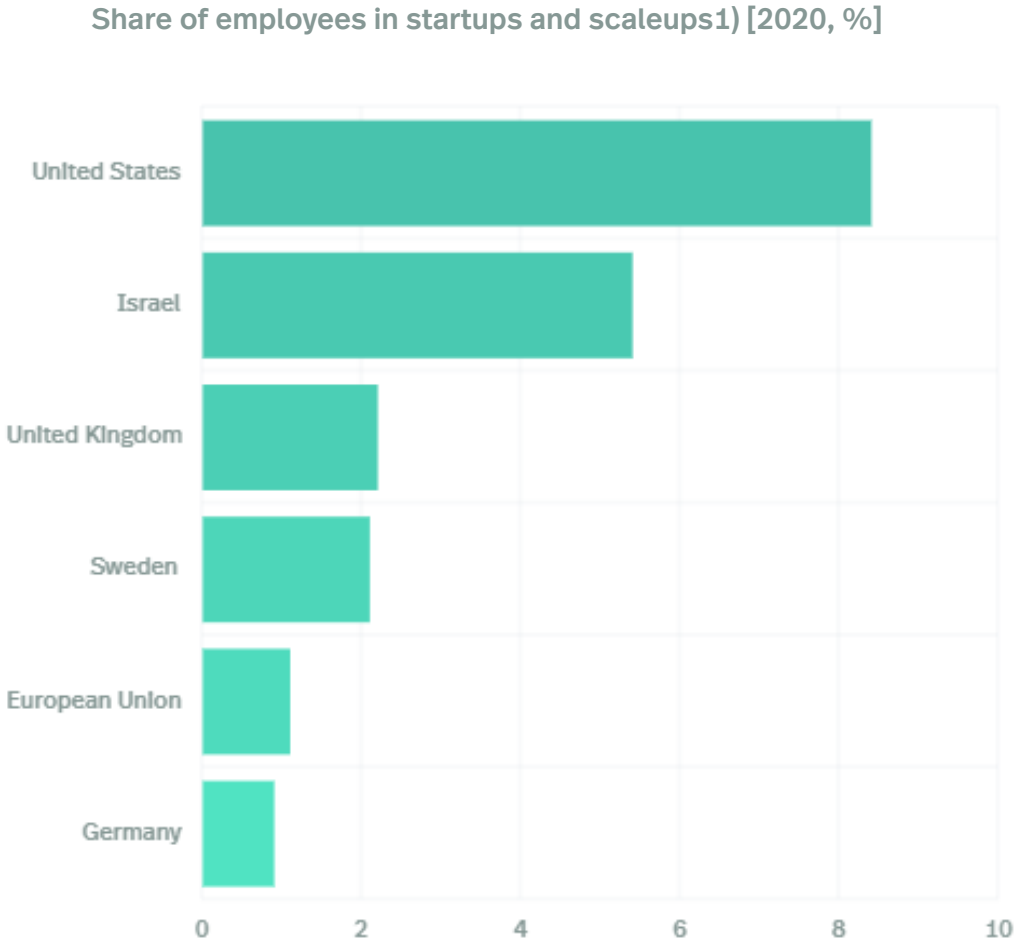
2)Source: Dealroom, Roland Berger

International comparison shows Europe's need to catch up – Germany in particular has a lot of room for improvement

While a large share of the total workforce is employed in startups in leading startup nations like Israel or the US, in Europe the figure is only 1.1%

Germany performs particularly poorly in this statistic: In the world's fourth-largest economy, less than 1% of the workforce works in startups

Since startups have extremely positive effects on the labor market among other things, it is worthwhile at this point to facilitate the founding of startups through positive political incentives



1)The Dealroom dataset was adjusted for spin-offs, German subsidiaries of international corporations, non-profit organizations and the like. Overall, the number of employees in startups in Germany was corrected downward by 22.6%. A correction of the same amount was made for the peer countries

2)Sources: Dealroom, Oxford Economics, Roland Berger

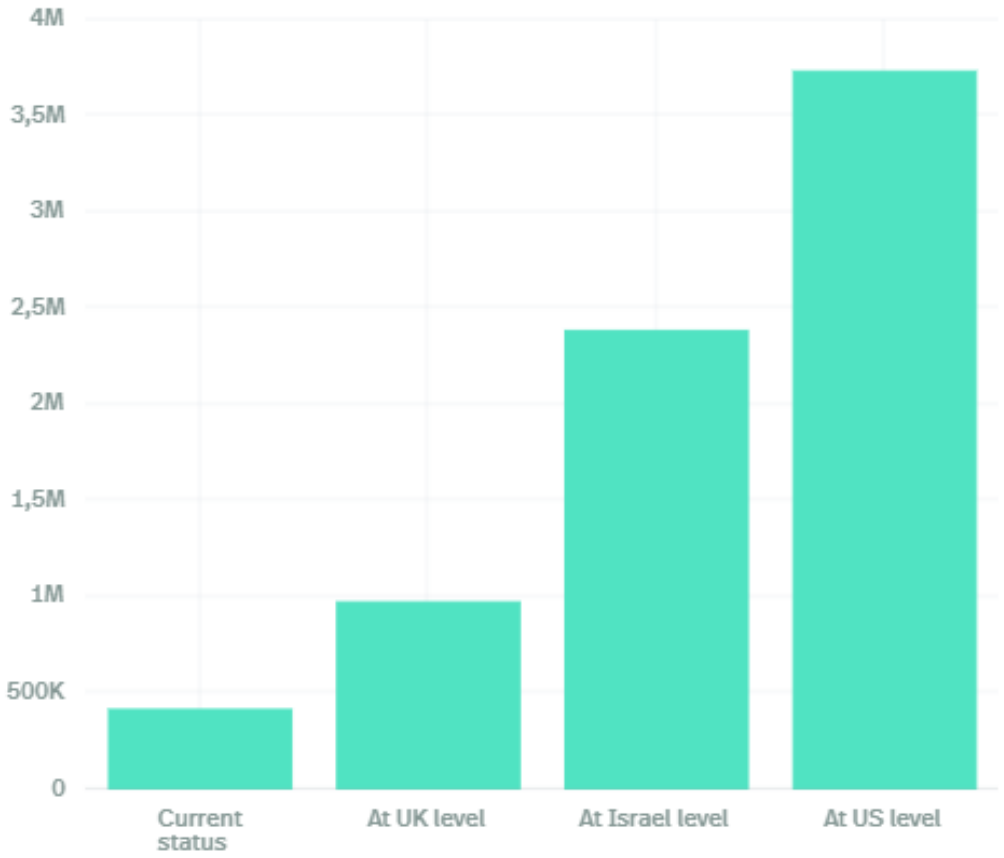
The data for Germany show that thousands more jobs could be created if Germany leveraged its potential

The startup sector has enormous potential for the labor market – both for Europe and especially for Germany

If Germany managed to increase the proportion of its workforce employed in startups to the level of Sweden (2.1%), this could create 523,000 jobs – directly. The newly created jobs would provide even more jobs through the induced and indirect effects

Even though an increase in the proportion to the US level seems unrealistic, it would bring about 3.7 million jobs

Employment potential of German startups and scaleups by 2030 1)



1)The Dealroom dataset was adjusted for spin-offs, German subsidiaries of international corporations, non-profit organizations and the like. Overall, the number of employees in startups in Germany was corrected downward by 22.6%. A correction of the same amount was made for the peer countries

2)Sources: Dealroom, Oxford Economics, Roland Berger

05 - Key Takeaway

Startups are the key driver of economic growth and future prosperity in Europe. They have to be at the center of every government's economic agenda and can play a key role in the transformation to sustainable economies

06 Innovation, talent and startups rely on capital

Foundations of the internet economy – Part V

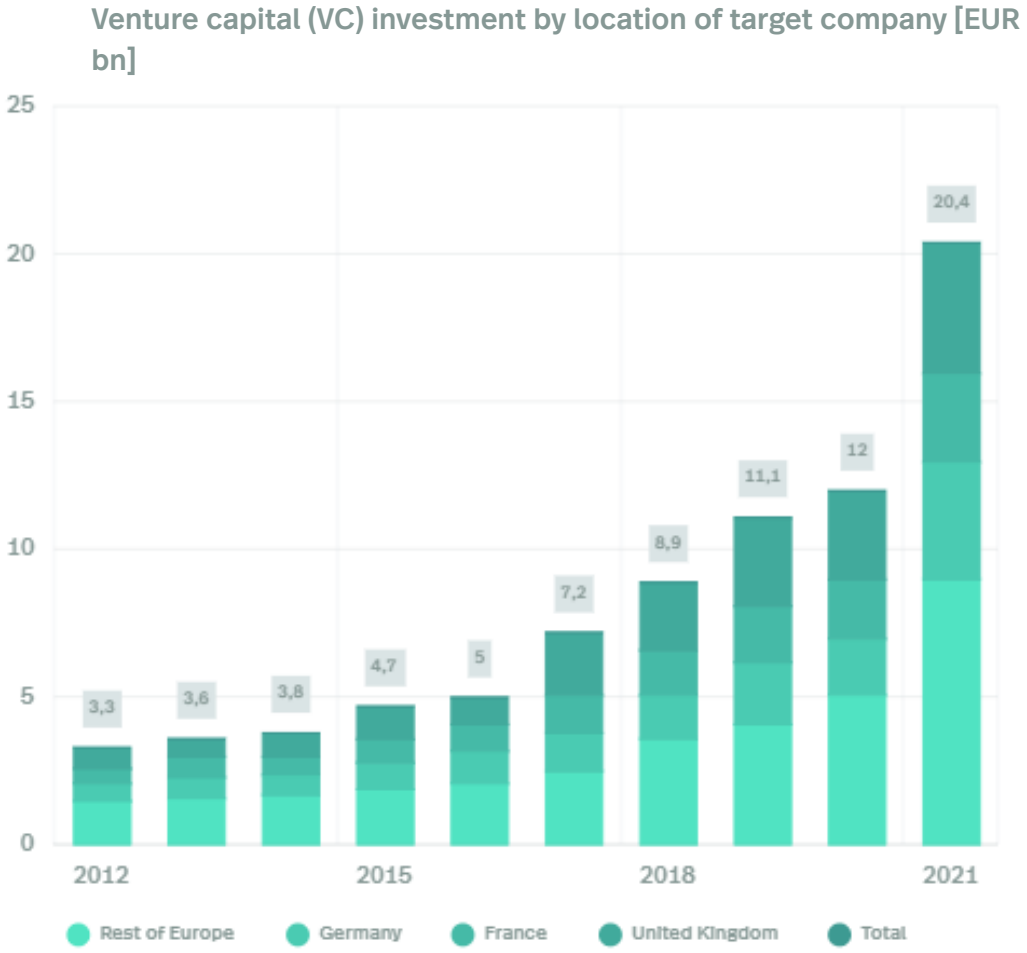
While VC investments in Europe have increased markedly in the last year, 2022 is likely to be a challenging year

The amount of venture capital invested in European companies has recently grown by more than 40% from EUR 12 bn in 2020 to EUR 20 bn in 2021

However, 2022 looks to be a challenging year for VC investments. Due to high uncertainty and a changing interest rate environment, valuations have come under pressure, as the data as of Q1 2022 suggests

The exorbitant growth in 2021 can be explained by surging interest from foreign and non-traditional investors in Europe's maturing startup ecosystem, which has also driven up round sizes, as well as increased demand for remote digital products and services under the "new normal"

1)Source: Invest Europe



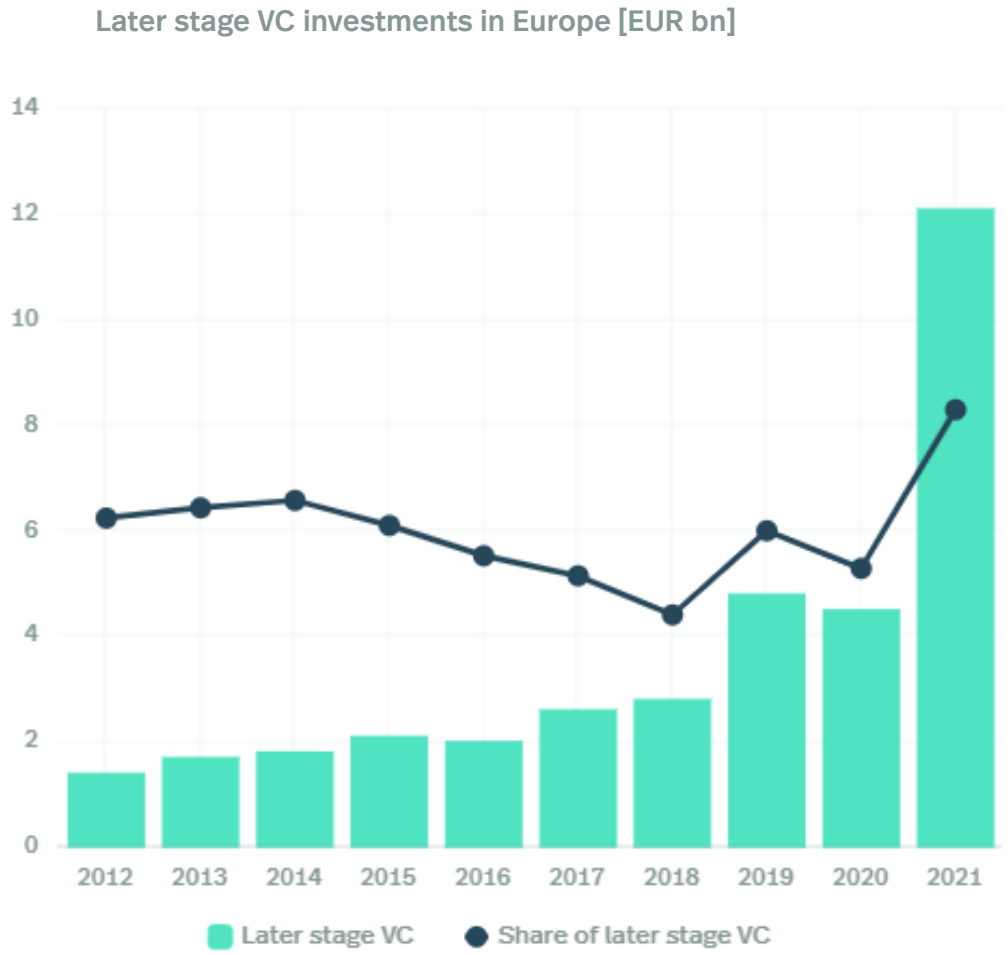
Following on from a steady decline in the share of later stage VC investments until 2018, this trend has reversed, reaching a new peak in 2021

The amount of later stage venture capital invested in European companies grew by 62% between 2020 and 2021, reaching more than EUR 12 bn

The share of later stage venture capital also peaked in 2021 with a share of nearly 60% of all VC investments

To further nourish the vibrant European startup ecosystem, the volume of later stage VC investments must nevertheless continue to grow – especially so as not to lose ground to other regions

1)Source: Invest Europe



VC investments are on the rise across the globe – Yet Europe trails markets in the US and Asia

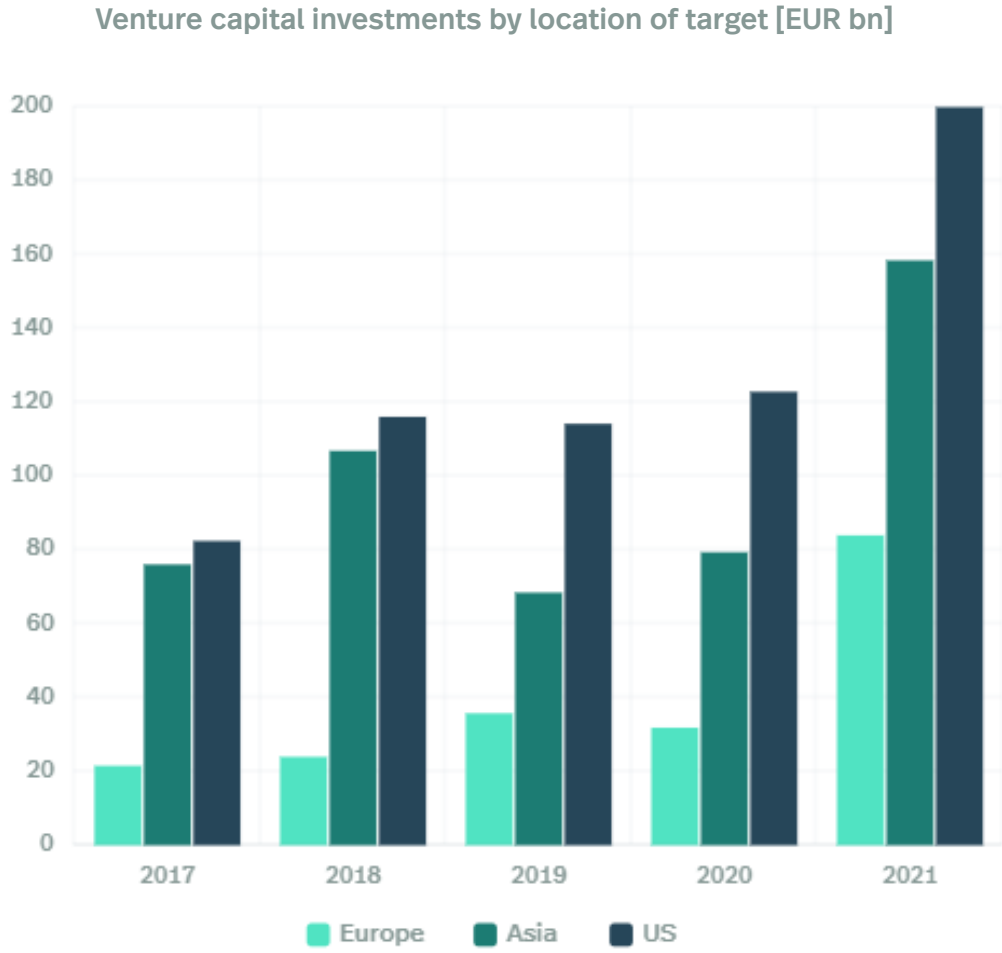
To compare venture capital investments across world regions, we draw on data from CB Insights, using a broader definition of what constitutes venture capital

Therefore, data on the European venture capital market displayed here differ from those shown in previous graphs

However, this does not limit the data's value for a global comparison

While the European venture capital market has grown by 38% each year, Europe is lagging behind Asia and the US in the absolute amount of venture capital invested

1)Source: CB Insights, Bloomberg



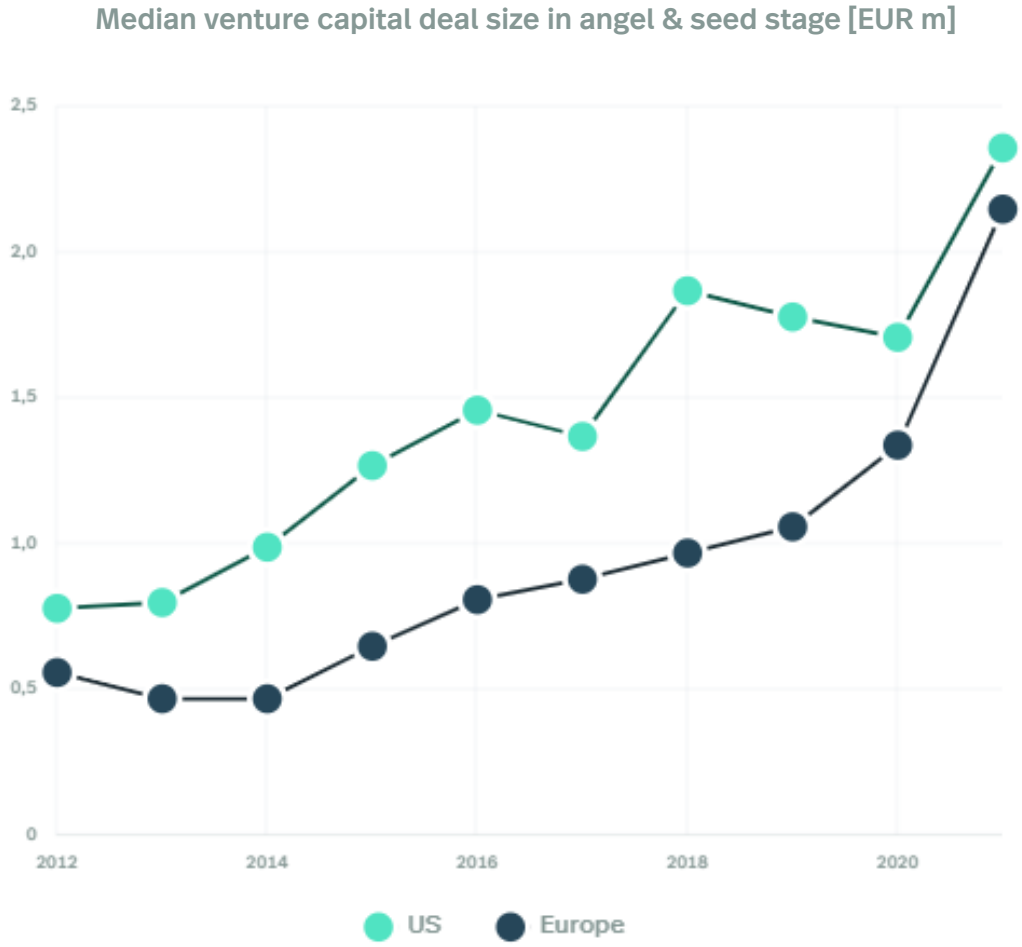
While the US and Europe are almost on a par at angel & seed stage, Europe clearly lags behind on early and later stage funding

The relatively weak position of the European venture capital market becomes even clearer when looking at the median funding companies receive at different financing stages

While the median European company's funding in the angel & seed stage is comparable to that of companies in the US, there is a sizable gap when it comes to early and later stage funding

The average transaction size of European companies is still around half that of their US counterparts in the late stage and almost two-thirds in the early stage

1)Source: PitchBook

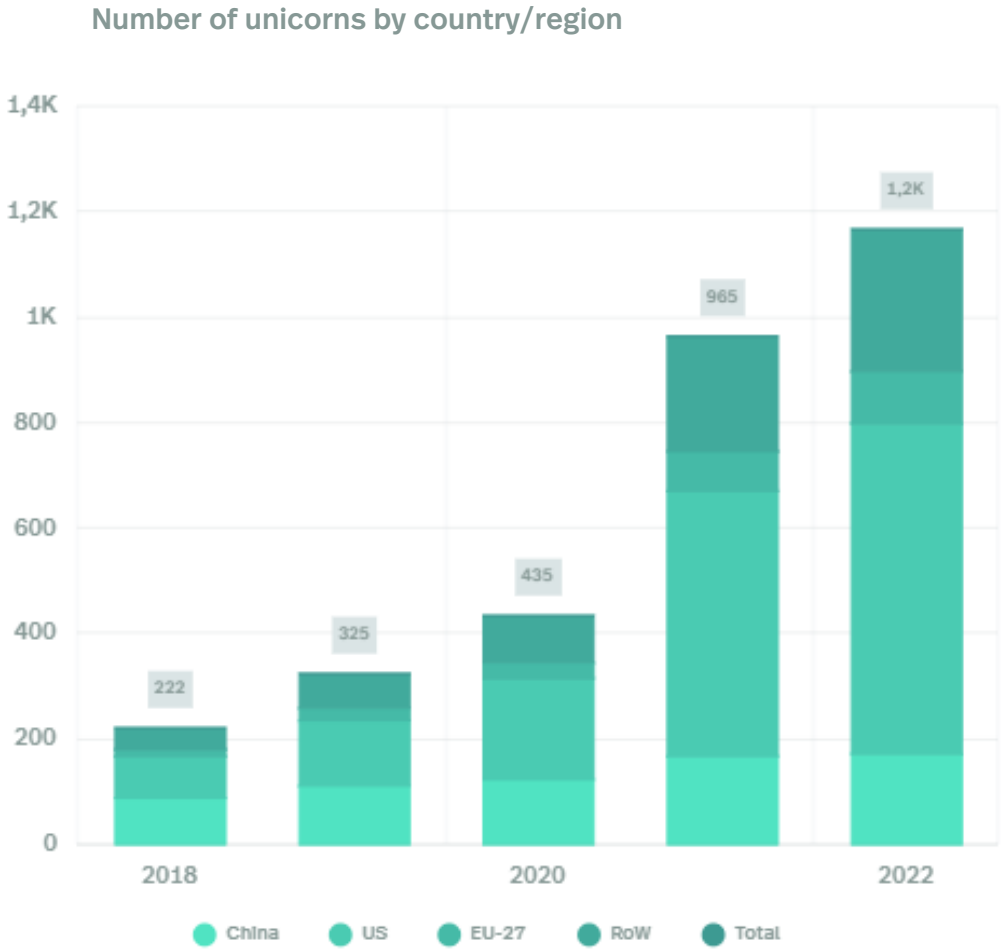


The EU is catching up significantly when it comes to the number of unicorns and their valuation, albeit starting from a low level

Unicorn valuations have fallen slightly in 2022, while their number is experiencing steady growth. The number has increased fivefold in the last four years, whereas the valuation has nearly tripled in the same time period

Starting from a negligible level, European unicorns have been able to manifest and expand their position globally. The number of unicorns coming from an EU country has grown at almost the same pace as that of US unicorns, and in terms of valuations, annual growth rates have even outperformed US counterparts

Among the list of unicorns are the variants of the decacorn, which includes startups valued at over USD 10 bn, and the hectocorn, which refers to companies valued at over USD 100 bn



1)A unicorn company, or unicorn startup, is a private company with a valuation of more than USD 1 bn

2)Most recent data as of July 2022

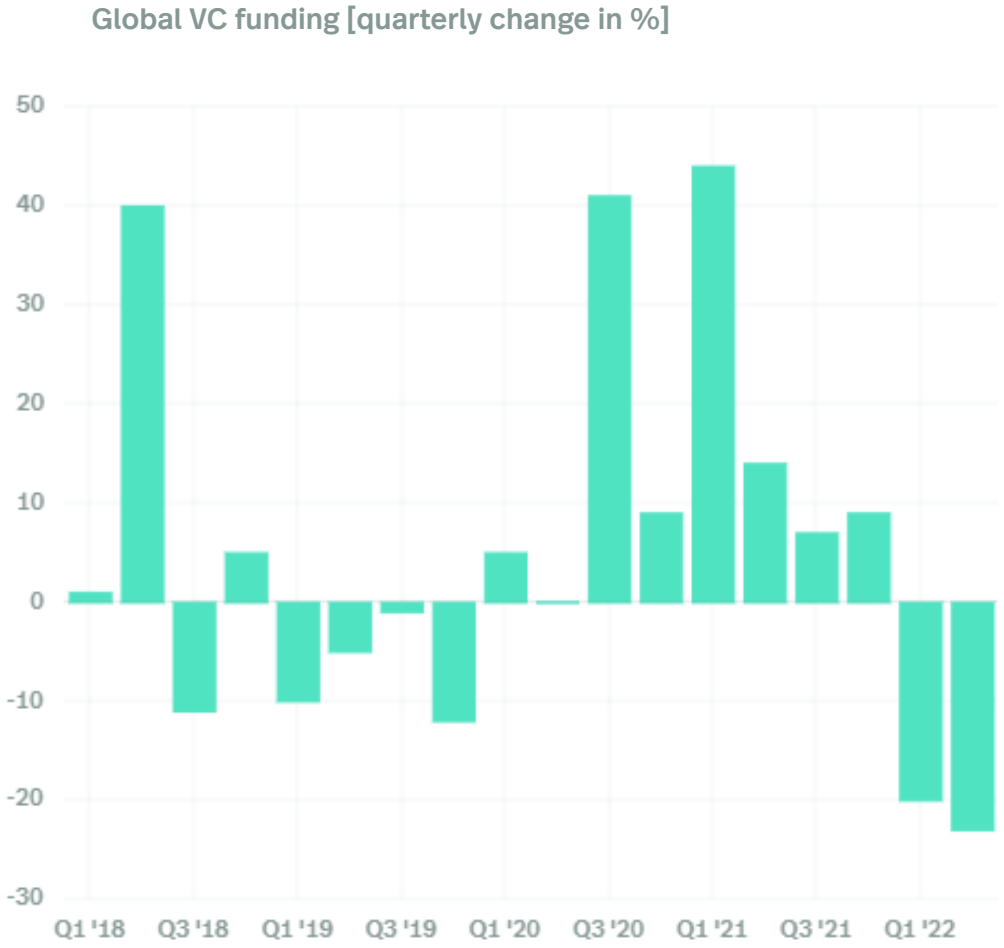
3)Source: TechStartups

The beginning of 2022 does not look promising as global VC funding drops significantly

After a record year in 2021, the first two quarters of 2022 do not look promising for the global venture capital markets

There are two major reasons for this: Tightening monetary policies and increasing uncertainty regarding the economic outlook worldwide have led to capital being invested in more secure assets

1)Source: CB Insights



06 - Key Takeaway

Europe lacks venture capital to fund innovative companies, especially in the later stage. This shows in the number of unicorns – Europe has been catching up due to sky-high growth in 2021, but still lags far behind the US and China

07 Fair play in the digital arena

Foundations of the internet economy – Part VI

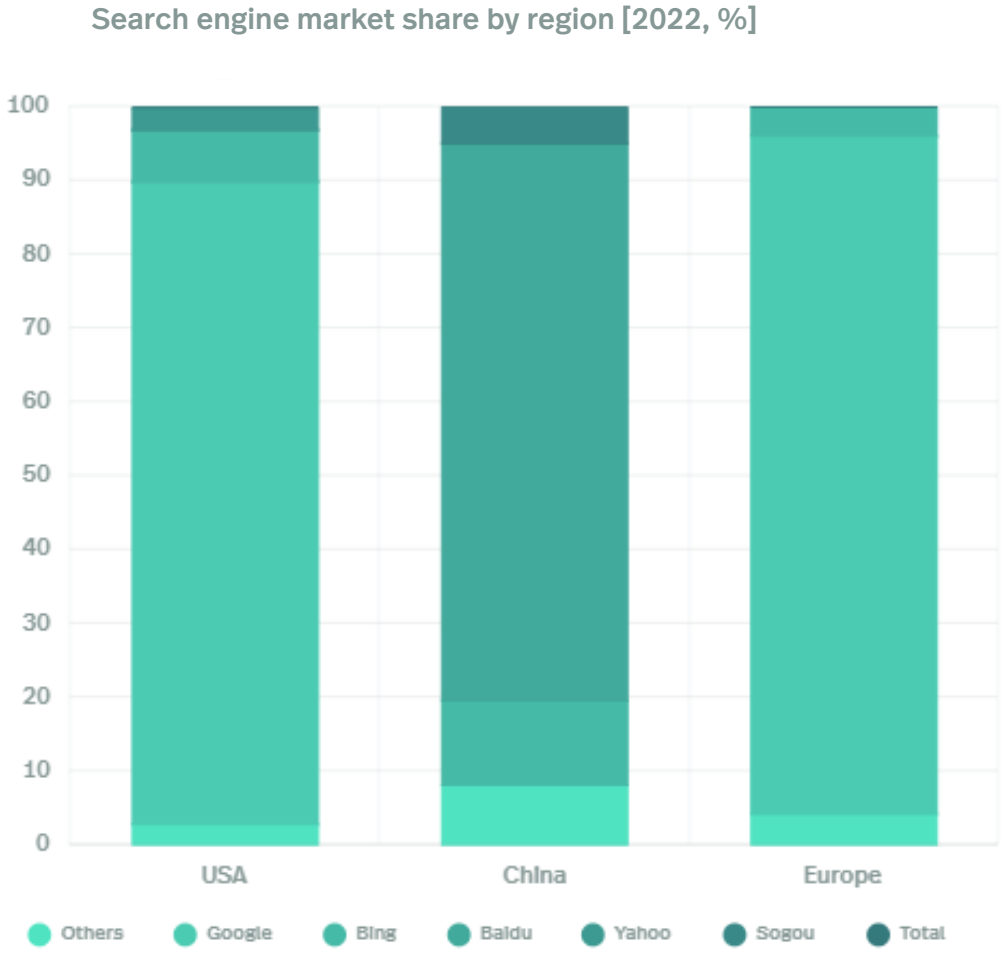
Large digital platforms are the dominant key players of the internet economy, with huge market shares across the globe

Google dominates the market for search engines in the western hemisphere

The search engine market in China is beginning to look similarly concentrated. The dominant player, Baidu, has a market share of 75%

Attempts to establish alternative search engines to Google have not gained traction so far – Microsoft's search engine Bing, for example, has a market share of 6% in the US

1)Source: Statcounter



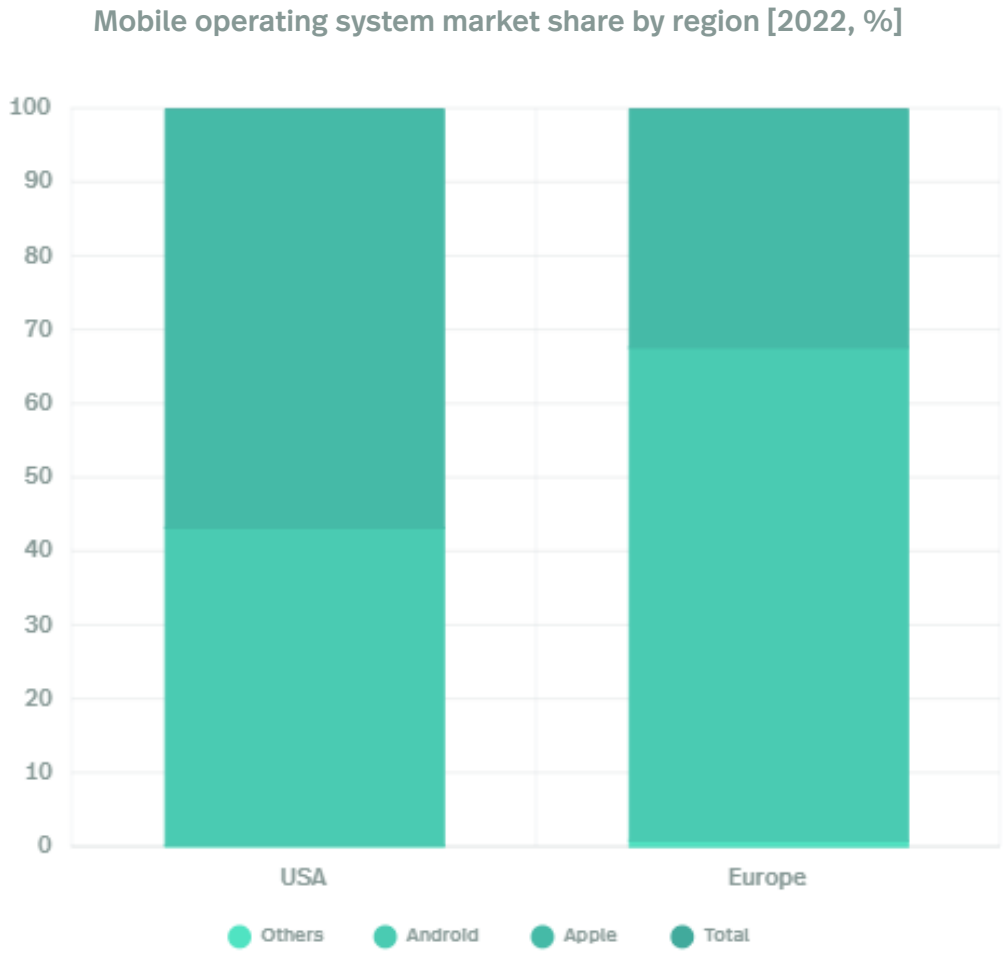
In Europe and the US, Google and Apple split the market for mobile operating systems among themselves

Mobile operating systems are the main gateway to the digital world for most consumers

The Digital Markets Act (DMA) demands an undertaking from Apple and Google (the so-called gatekeepers) to compete fairly and not to give preference to their own services

One example is that preinstalled apps in iOS and Android should be as easy to deinstall as third-party apps

Smaller competitors should also be guaranteed unbiased access to both platforms provided by the gatekeepers



1)Source: Statcounter

The world of social media is to a large extent shaped by Facebook and Google's YouTube

The graph depicts the share of specific social media platforms among the seven most popular social media platforms, measured by monthly active users

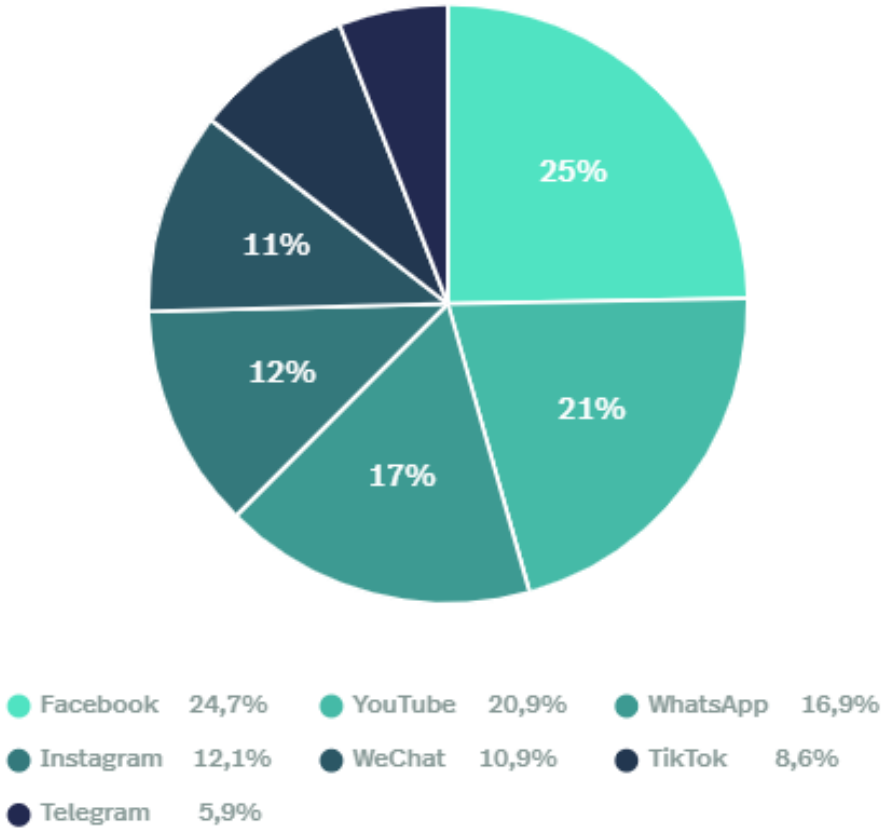
Facebook and its wholly owned subsidiary Instagram have a market share of around 47% combined

Another fifth of all monthly active users can be attributed to Google's YouTube

Thus, two companies dominate around 53% of the global social media market

1)Source: Datareportal

Market share among the seven most popular social media platforms worldwide [2022, %]



The market for mobile messenger apps mirrors this pattern – Large digital platforms divide the market among themselves

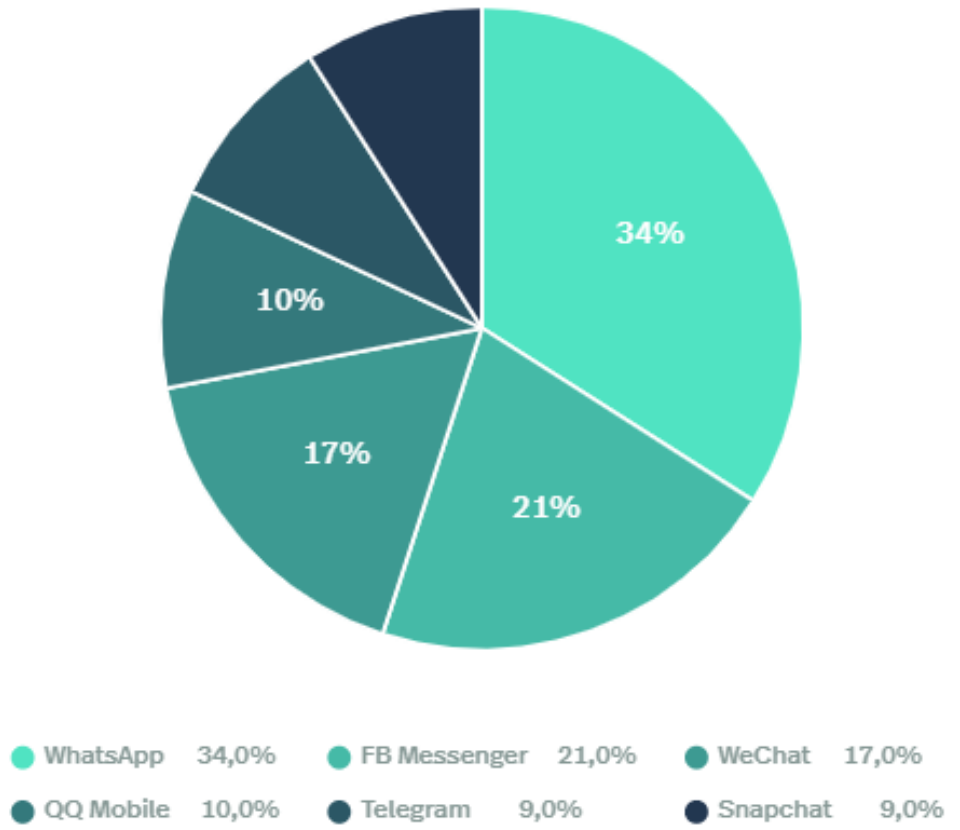
Again, market share is measured as the share of each mobile messenger service among the six most popular mobile messengers, based on monthly active users

As with other digital services, the market is dominated by a very small number of internet platforms

Facebook and its wholly owned subsidiary WhatsApp have a market share of 55%

1)Source: Statcounter

Market share among the six most popular mobile messenger services worldwide [2022, %]

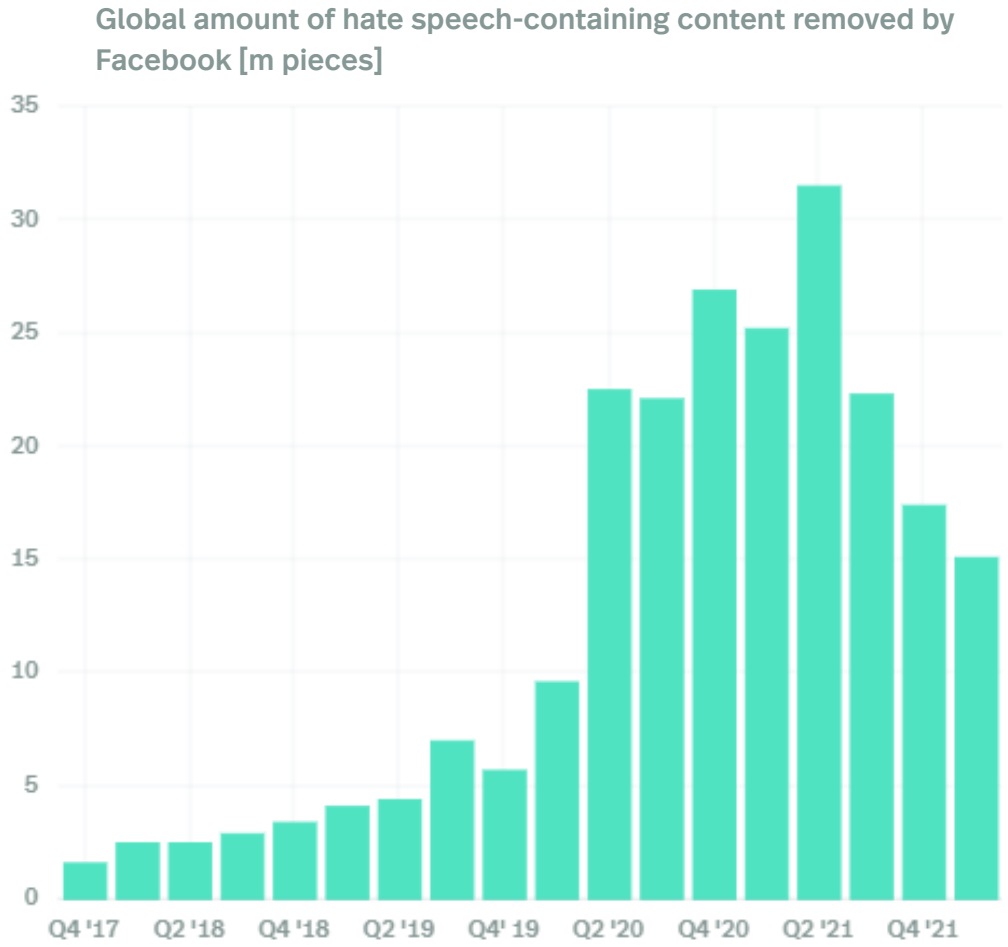


Online hate speech skyrocketed during the pandemic – The Digital Services Act aims to combat illegal online activities

With the rise of social media, there has been much debate about combating hate speech. After a high in Q2 2021, the amount of hate speech-containing content removed by Facebook is decreasing again

The Digital Services Act (DSA), proposed by the European Commission and agreed upon by the European Parliament and Council, aims at reducing illegal activities on the internet, especially on social media platforms. By way of example, reporting of hate speech is to be simplified, but at the same time the right to freedom of speech is to be promoted

1)Source: Facebook



Global advertising spend is moving to the digital sphere, with spending on mobile advertising growing in particular

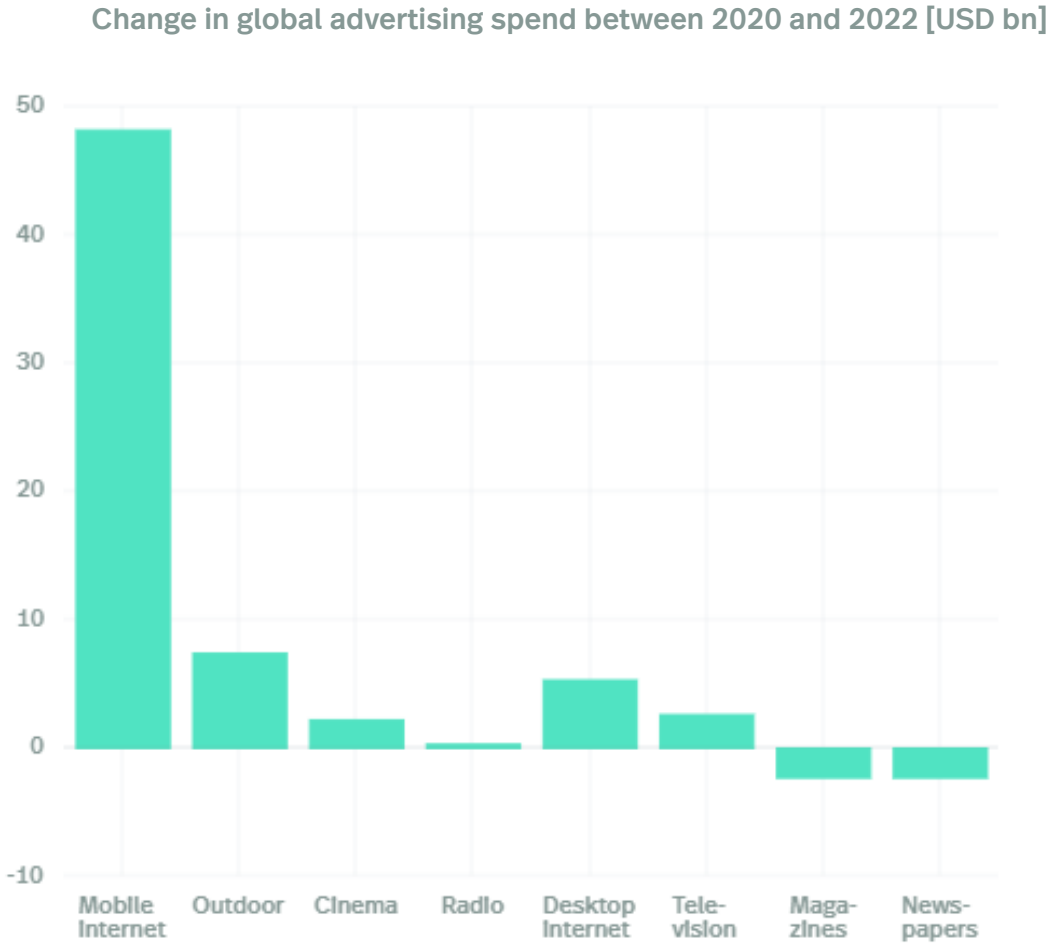
Mobile internet has seen an ever-increasing interest in global advertising over the past decade

In the last two years, advertising has expanded, especially on the mobile internet. The increase in spending is about 6.5 times greater than the increase in advertising spend in the outdoor segment

Traditional media will not benefit from increased spending on advertising

In the future, less will be invested in print media for advertising purposes. This is in line with the trend towards digitalization

1)Source: Zenith

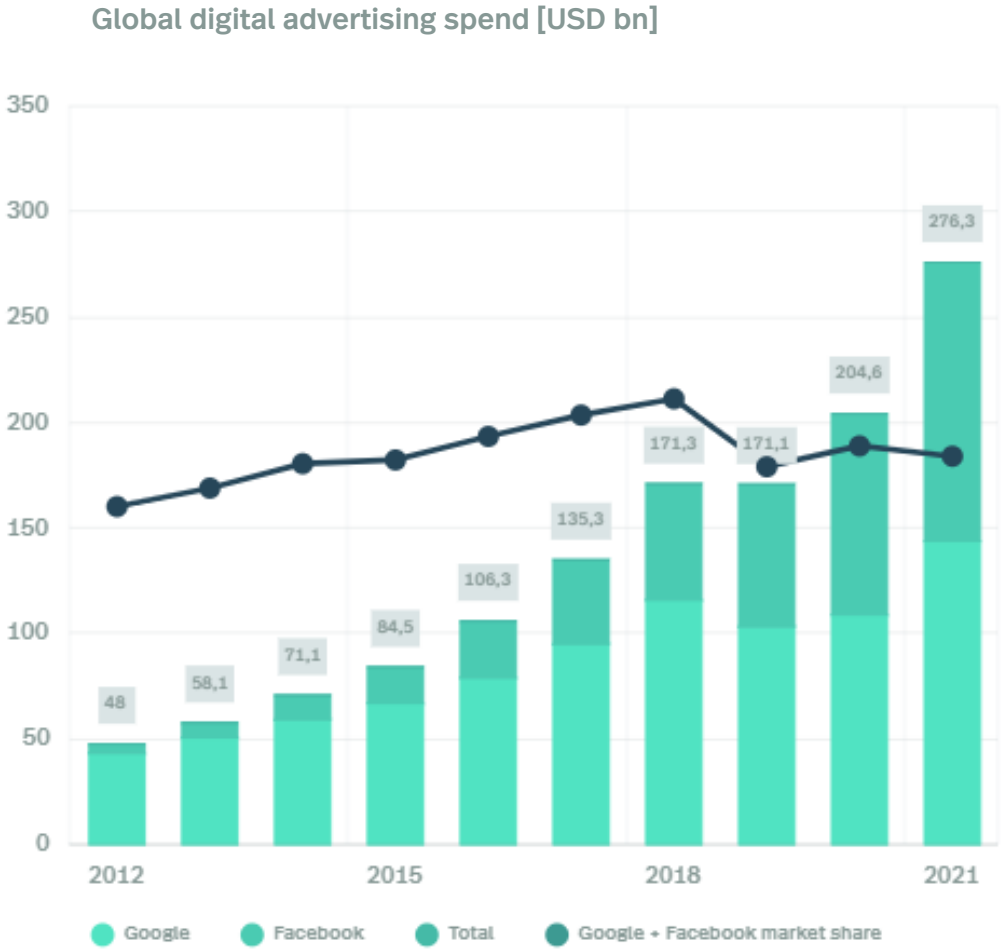


The digital advertising market has been growing by 20.3% each year since 2010 – Google and Facebook divide half of the market among themselves

Google and Facebook steadily increased their share of this market until 2018. Since then, their market share has fallen due – among other things – to rising competition from Amazon, especially in the US market

In 2022, the two digital platforms were on the receiving end of 53% of the total global digital advertising spend

1)Source: eMarketer



Digital platforms turn their market shares into economic success – Six of the ten most valuable companies are digital platforms

Just seven years ago, only three of the most valuable companies were digital platforms (Apple, Alphabet, Microsoft)

Eleven years ago, just Apple and Microsoft ranked among the ten most valuable companies

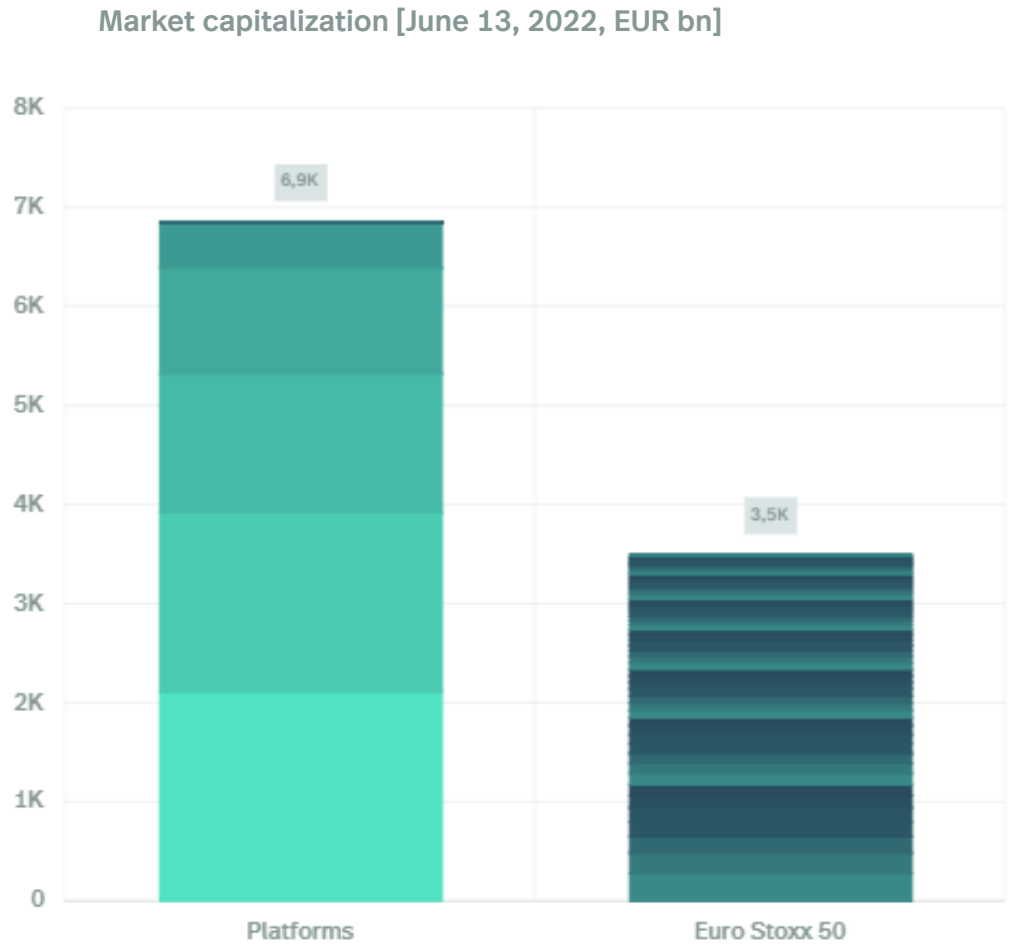
1)Source: Bloomberg

The market capitalization of the six most valuable digital platforms is almost twice as high as the total of all Euro Stoxx 50 members

The seven most valuable digital platforms have a market capitalization of more than EUR 8 bn

This is more than twice the sum of the market capitalization of all member companies of the Euro Stoxx 50 Price Index. However, this extraordinary ratio is adjusting in 2022

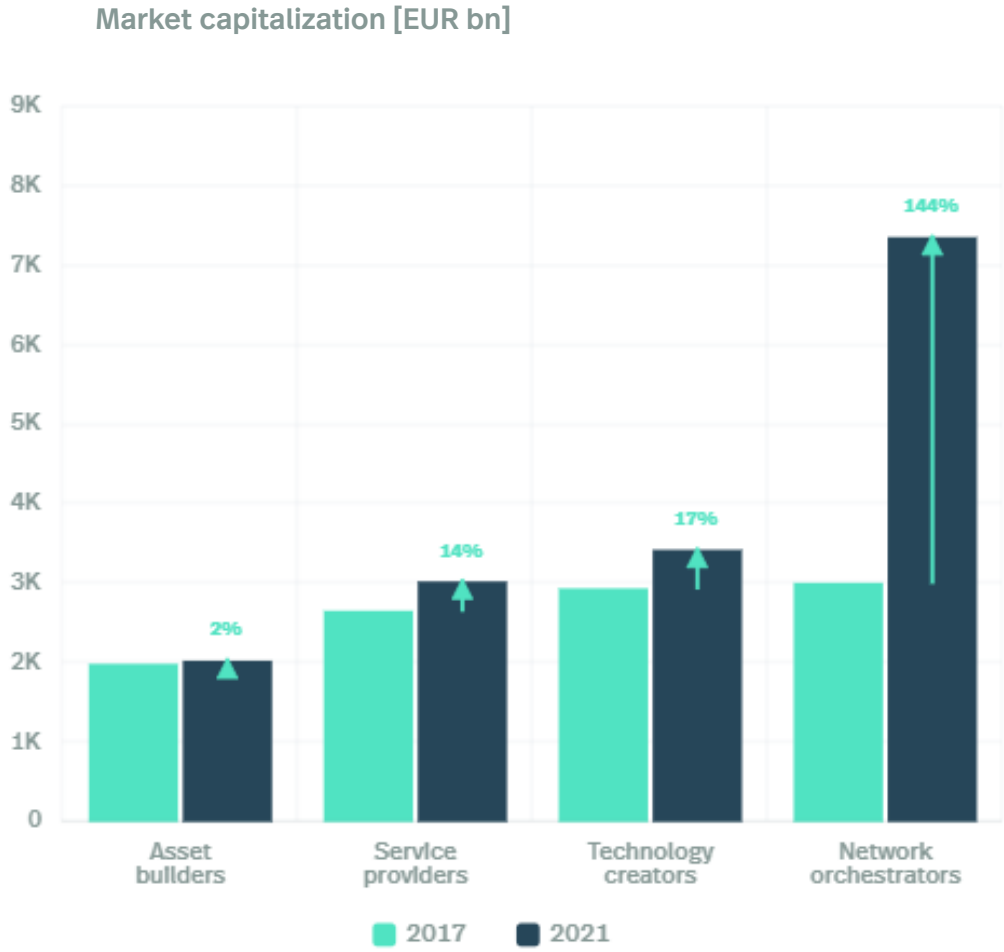
1)Source: Bloomberg



Platform-based business models have outgrown traditional industry sectors in recent years

The high market capitalization of the seven most valuable digital platforms follows a wider pattern: Companies whose business model focuses on the coordination of networks via digital platforms have seen much greater growth of revenues and market capitalization than companies that supply physical goods, design technology solutions or provide services

Examples of companies in the different groups:Asset builders:Volkswagen, Coca-Cola, WalmartService providers:Allianz, Bank of America, AxaTechnology creators:SAP, IBM, SamsungNetwork orchestrators:Alphabet, Oracle, Tencent



1)Source: Bloomberg

07 - Key Takeaway

Digital platforms continue to dominate the internet. Europe needs its own innovative business models – and a regulatory framework to ensure fair competition

08 The tech to come

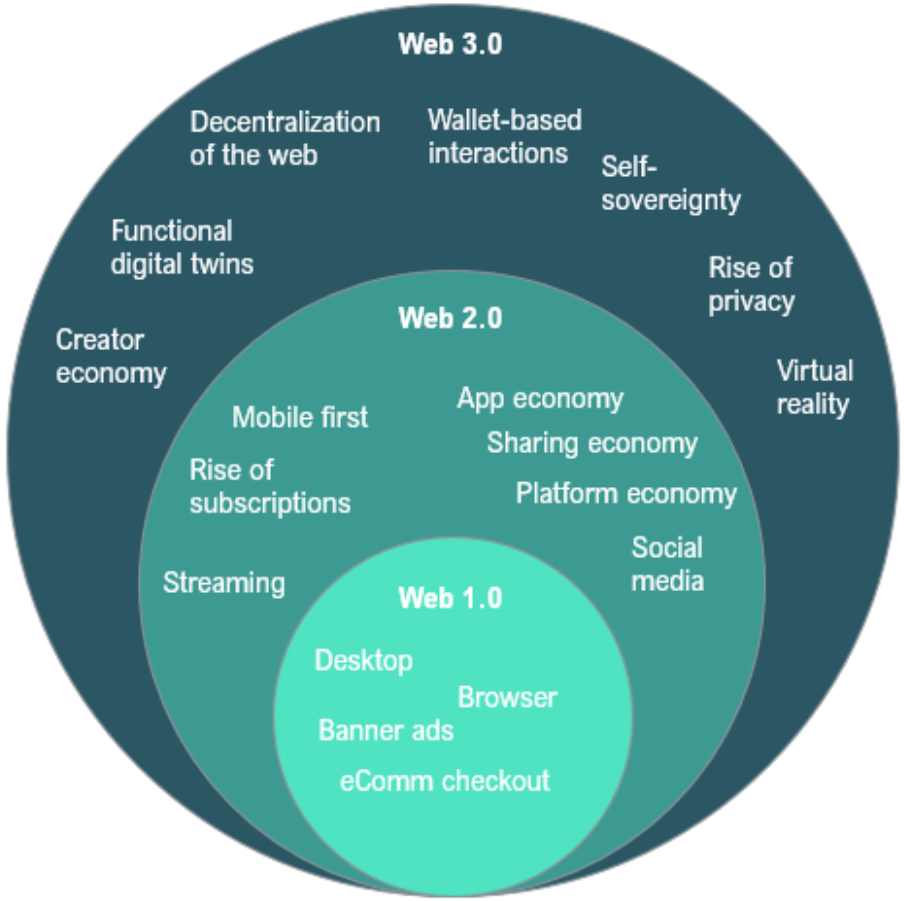
Web 3.0 and the metaverse

The Web 3.0 seeks to revolutionize the internet by decentralizing and democratizing the way data is stored and shared

The evolution of the internet is currently in the mid-to-late stages of the Web 2.0 innovation curve (transition from desktop to mobile computing and from local to cloud storage)

The next stage is referred to as Web 3.0 This term describes the evolution from the current – mainly centralized and platform-based – web towards a more decentralized network-based web powered by a crypto-based value exchange model, i.e. provided by blockchain technology

Web 3.0 applications change the way infrastructure and data are stored and shared. Web 3.0 companies aim to revolutionize connectivity infrastructure sharing. Other industry related companies try to fundamentally change the way data is shared and processed, aiming to unlock the potential of data outside of the centralized FAANG data pools

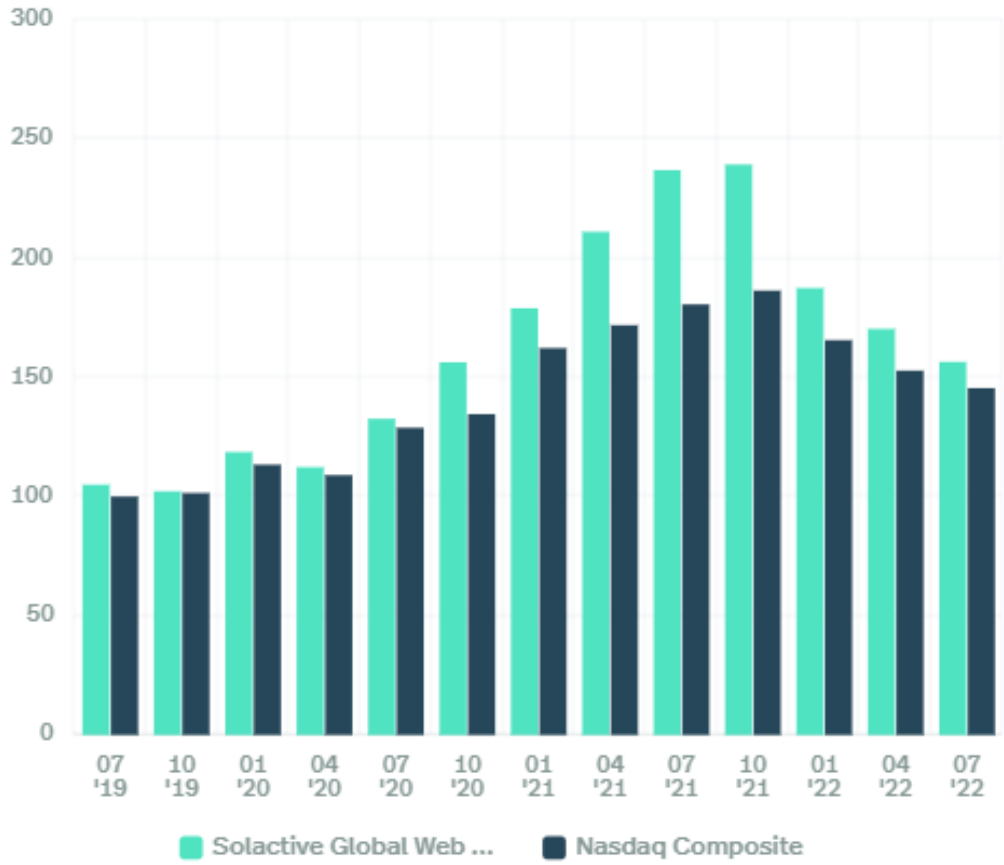


Following the pandemic-related slump, shares of companies related to Web 3.0 performed significantly better than others, indicating growing institutional interest

The developments around the new web 3.0 technologies have also reached the stock market. Solactive, a provider of stock market indices, has launched an index related to Web 3.0, representing companies that potentially stand to benefit from the adoption and usage of technologies expected to grow and support the functioning of the Web 3.0. This includes companies from the following industries: NFT & Tokenization, Blockchain, Metaverse, Big Data & AI

Among the companies are established tech companies such as Meta or Nvidia but also new players like Roblox or Coinbase. The Global Web 3.0 Index has impressively outperformed the strongly tech-related Nasdaq Composite

Performance of selected stock indices [index, 07/2019 = 100, quarterly data]



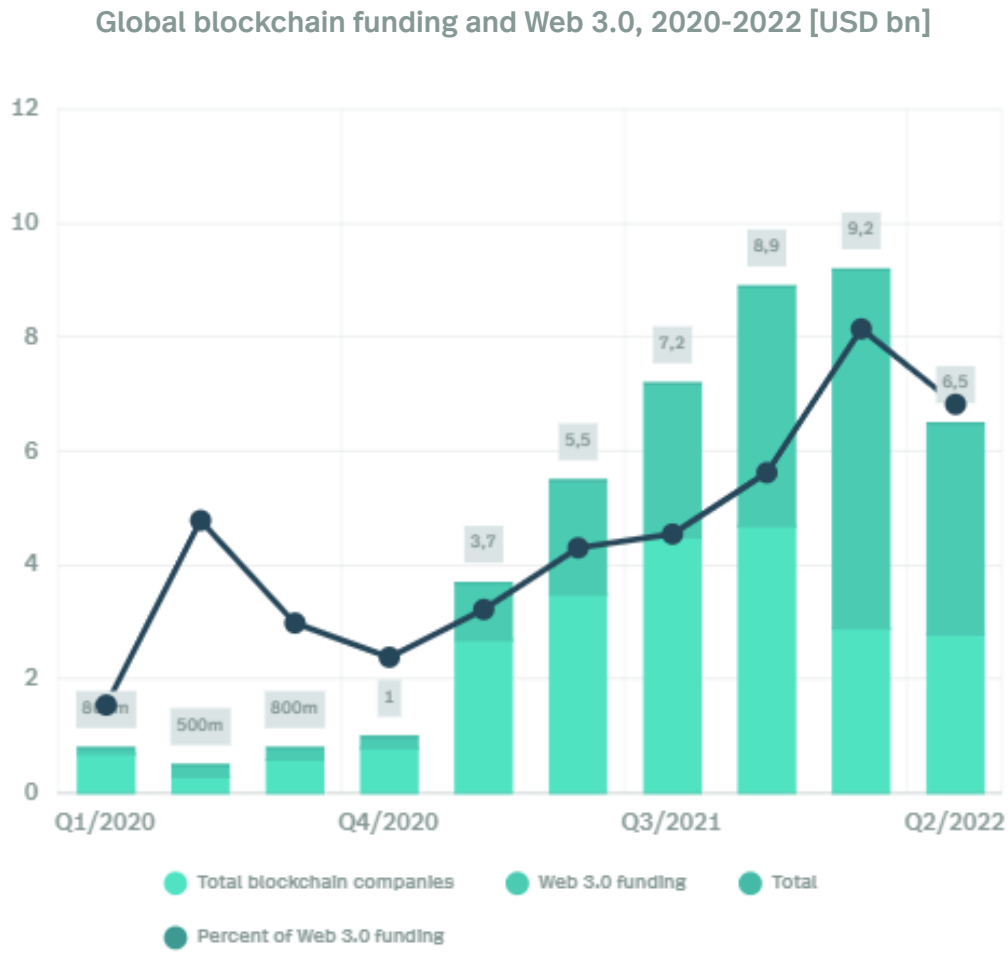
1)Source: Bloomberg

While investments in blockchain in general have increased sharply, the share of those investments in Web 3.0 has massively expanded

The global blockchain market has seen rapid growth over the past two years, with global investment volumes growing from just under a billion to more than USD 9 bn

Web 3.0 investments, considered as part of blockchain investments, have multiplied both in absolute terms and as a percentage of total blockchain funding, and now account for nearly two-thirds of total blockchain funding

Although the general venture capital market has already been witnessing a sharp decline since Q1 2022, both blockchain and dedicated Web 3.0 funding increased in that same period before also starting to decline in Q2 2022 in line with the overall venture capital market

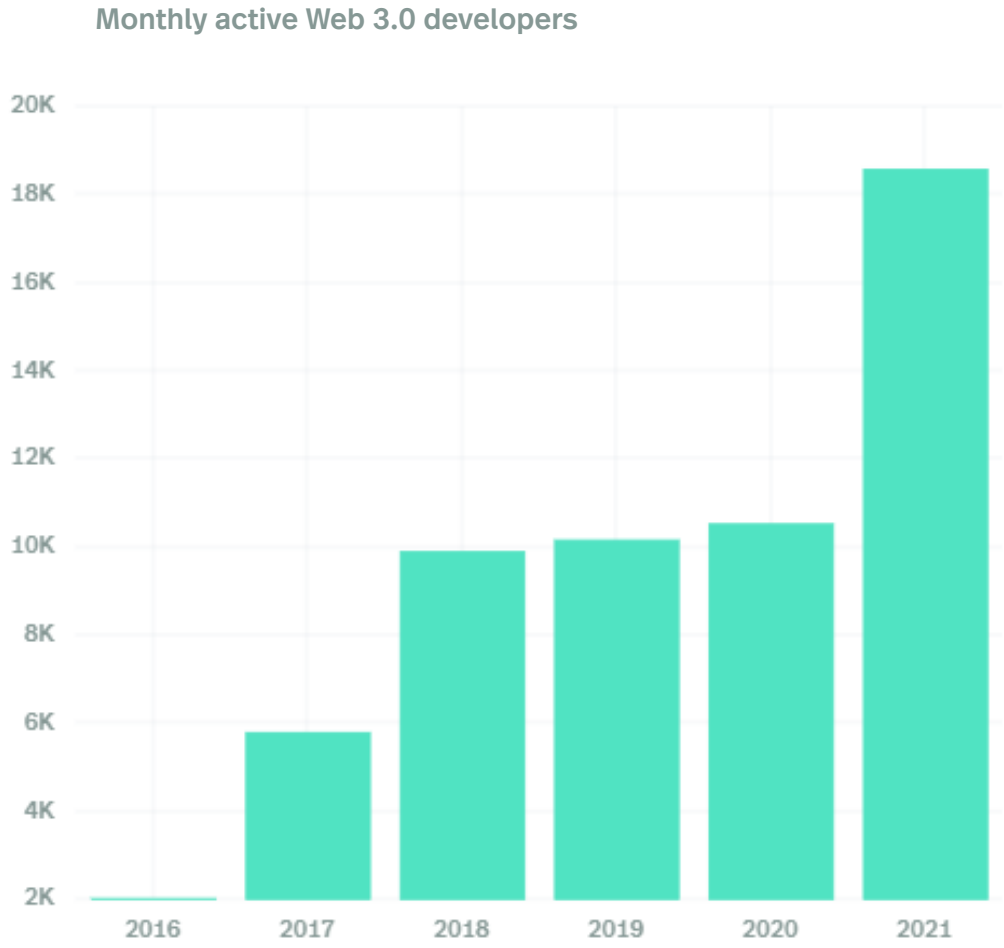


1)Source: CB Insights

Even though the number of Web 3.0 developers is still comparatively small, its developer base shows astonishing growth rates

Web 3.0 opens up completely new possibilities for ambitious developers. It requires a new model for software development on distributed blockchains and thus marks a drastic shift away from traditional architectures. Depending on the perspective, there is definitely an opportunity for developers to jump on the latest trend

As Web 3.0 is still a fairly new development, the developer base is still quite small compared to more traditional programming languages, with around 18,000 developers – in comparison, there are more then 11 million Python developers around the globe. That said, the developer base of Web 3.0 developers is growing rapidly, and has increased by more than 50% p.a. in recent years



1)Source: ElectricCapital

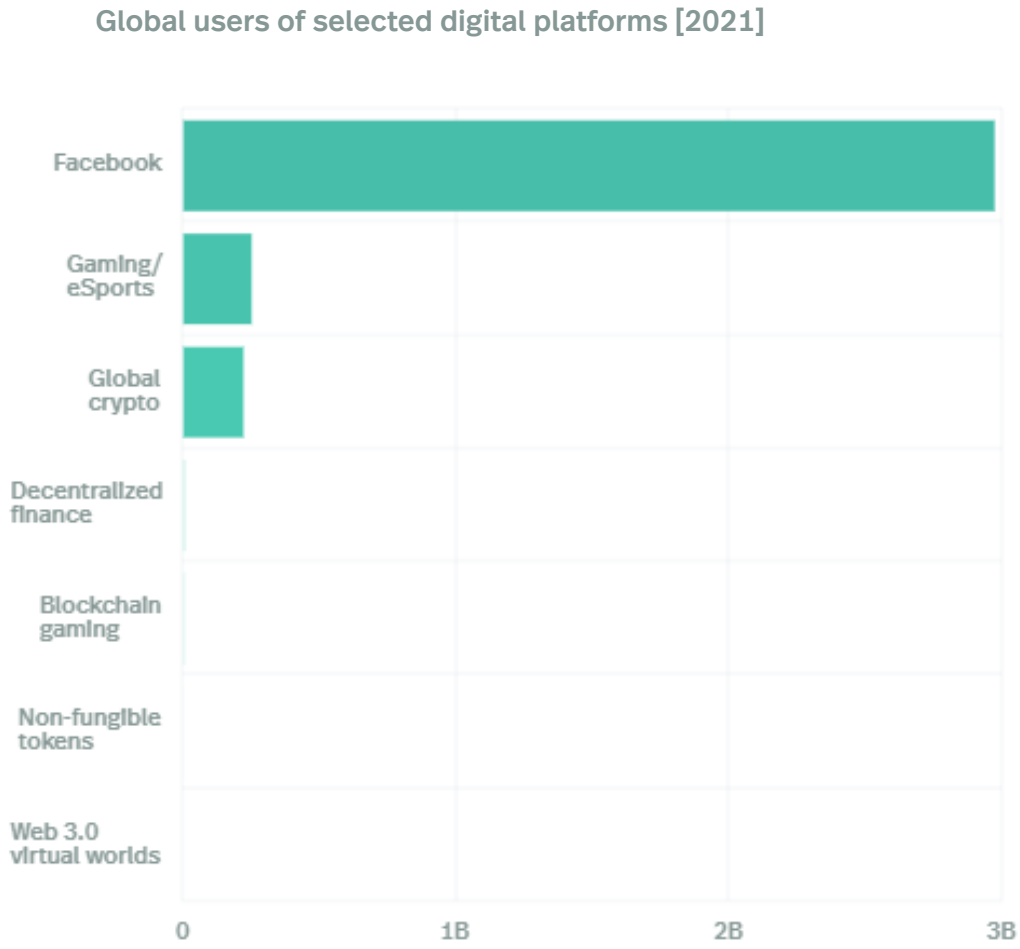
Compared to today's well known digital platforms, Web 3.0 related platforms have a small user base

Digital platforms gained a surge of attention in October 2021, when Facebook Inc. rebranded and restructured itself as Meta, a virtual reality company, in a pivot towards the metaverse

As of that month, Facebook was the leading digital platform with a total of almost three billion users worldwide. By contrast, Web 3.0 virtual worlds had a grand total of 50,000 users around the globe

As of today, it can be expected that Web 3.0 will also experience significant growth over the coming years as Web 3.0 is still in its infancy

1)Source: Grayscale



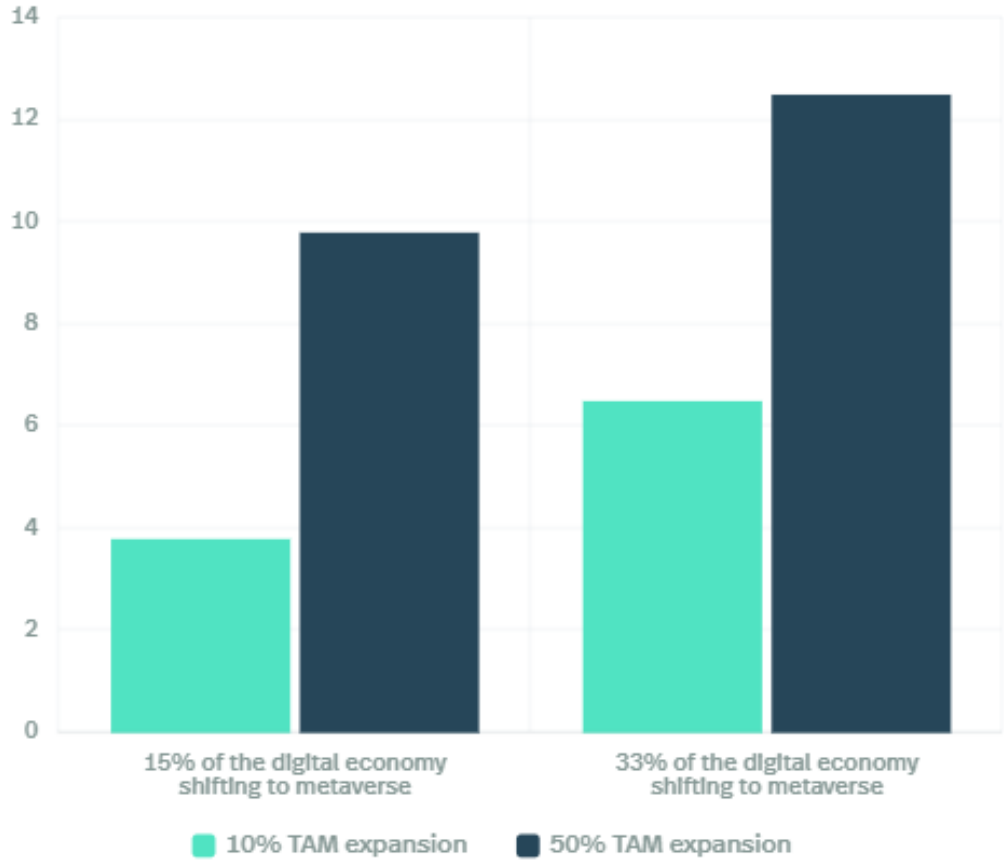
The potential market opportunity of the metaverse totals up to USD 12.5 tn, depending on the share of digital companies shifting to the metaverse

The potential metaverse market opportunity ranges from USD 3.8 tn to USD 12 tn, depending on the share of the digital economy that shifts to the metaverse and the expansion of the total addressable market (TAM)

The development of the metaverse will require collaboration across companies, creators and policymakers. Continued investment in product innovation and tech talent will also be needed: Meta announced plans in October 2021 to create 10,000 high-skilled jobs in the European Union over the coming years to build the metaverse

1)Sources: Goldman Sachs, World Bank, United Nations

Potential global Metaverse market opportunity 2021, by scenario [USD tn]

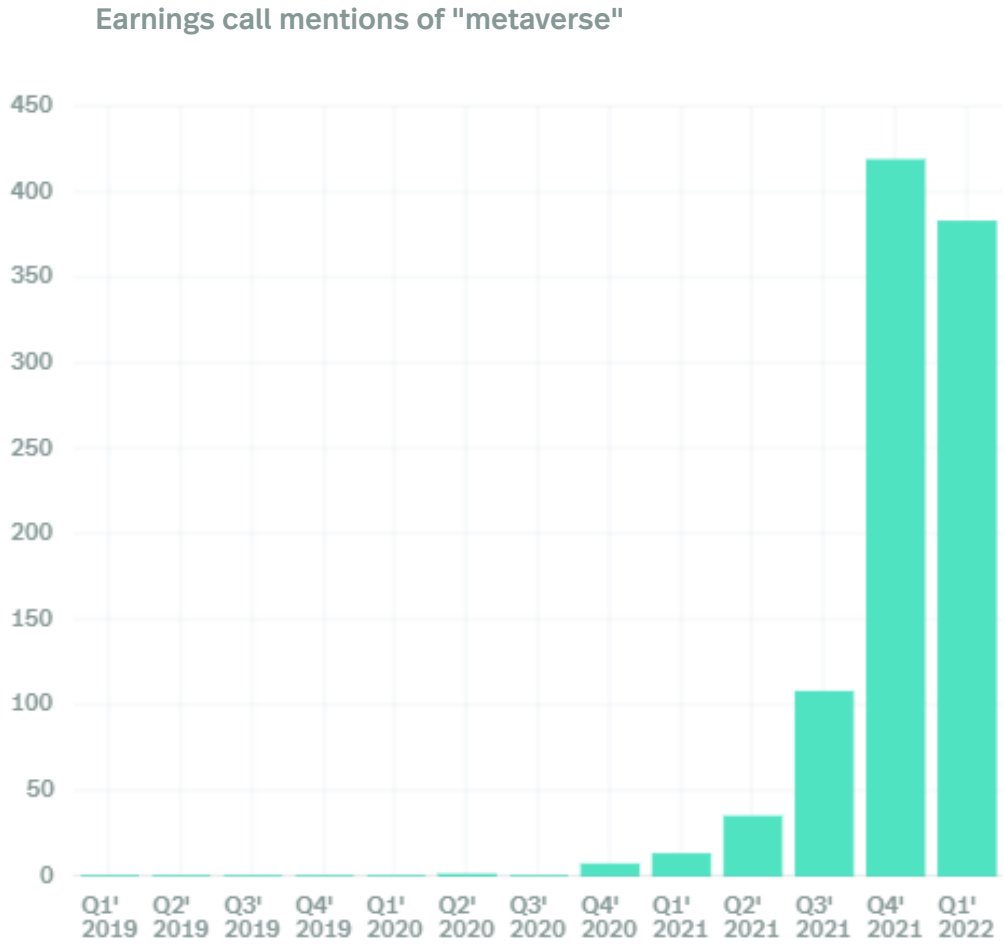


This enormous market potential is also observed by traditional businesses, reflected by increased mentions in earnings calls

The business world seems to be obsessed with "the metaverse": the concept of shared worlds driven by virtual products and digital experiences that are highly immersive and interactive

While the space is still in its early stages, the longer-term implications may not be trivial. Some users – especially younger ones – may eventually earn, spend and invest most of their money in digital worlds

This market potential has caught the attention of players across industries. Facebook rebranded itself “Meta” late last year, and earnings call mentions of the metaverse quadrupled in Q4' 2021



1)Source: CB Insights

Companies from several industries are already investing in the metaverse, as it offers a wide range of business fields

There are a few ways businesses can use the metaverse, from marketing to alternative revenue streams, as well as more abstract ideas such as digital land resale and NFT ownership, not to mention virtual spaces and events

Marketing: Investment in the metaverse by traditional companies creates a lot of media attention for the investing company. Furthermore, it might also give a strong indication of people's appetite for companies to be involved in the new field of the crypto metaverse. The public reaction, or the lack thereof, can be a good indicator of whether the metaverse is a promising direction for a company to move in

Alternative revenue streams: The Customers' appetite for NFTs has increased significantly over recent months and provides businesses with a new revenue stream should they mint their own NFTs for use within a metaverse. The options for this range from clothing for the virtual avatar in the metaverse to virtual properties

Leading business sectors worldwide that have already invested in the metaverse [03/2022, %]

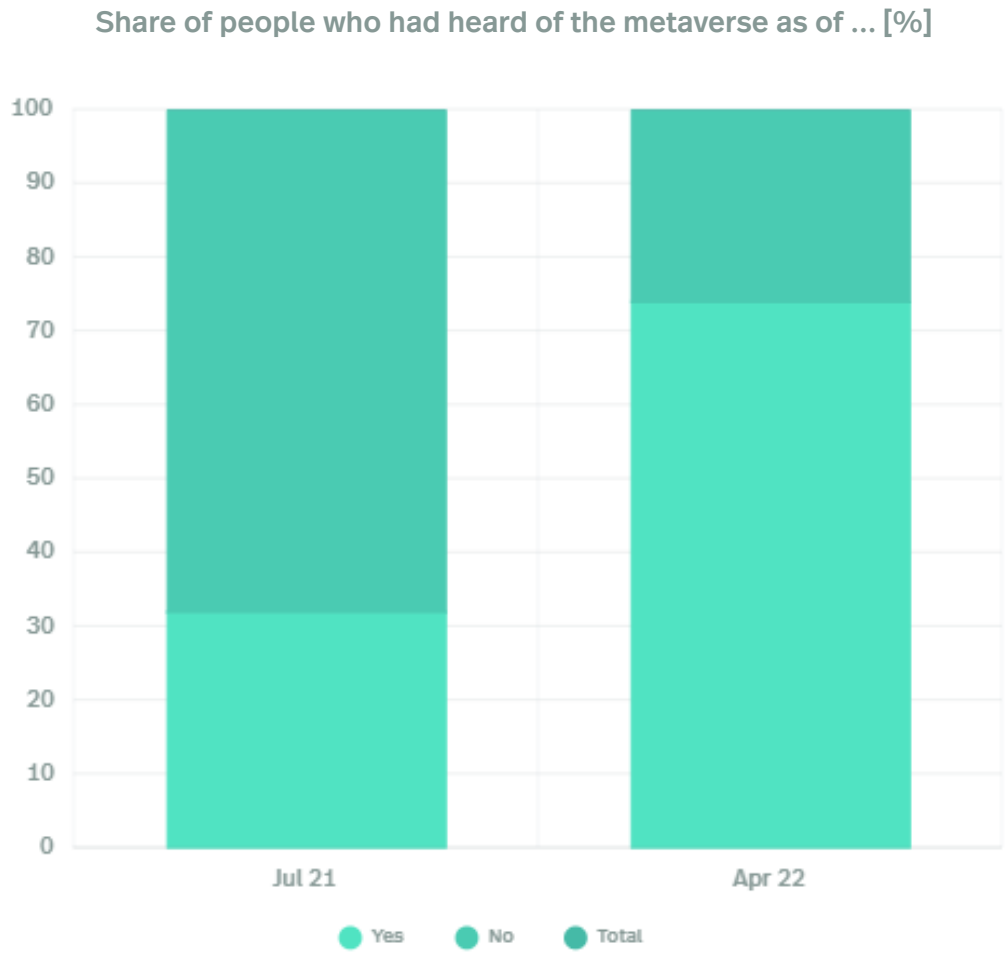
1)Source: Sortlist

The public awareness for the metaverse is on the rise, not only due to Facebooks rebranding itself Meta

In the future, the metaverse is likely to expand into an interconnected and limitless world where our digital and physical lives fully converge

As of today, it is characterized by the use of augmented and virtual reality to create a highly digitalized world that can be a bridge between the digital and physical world. As an evolution of social technologies, the metaverse allows digital representations of people, avatars, to interact with each other in a variety of settings

Even though the share of people who have heard of the metaverse has risen tremendously over recent months, only 15% of respondents actually know what the metaverse is about



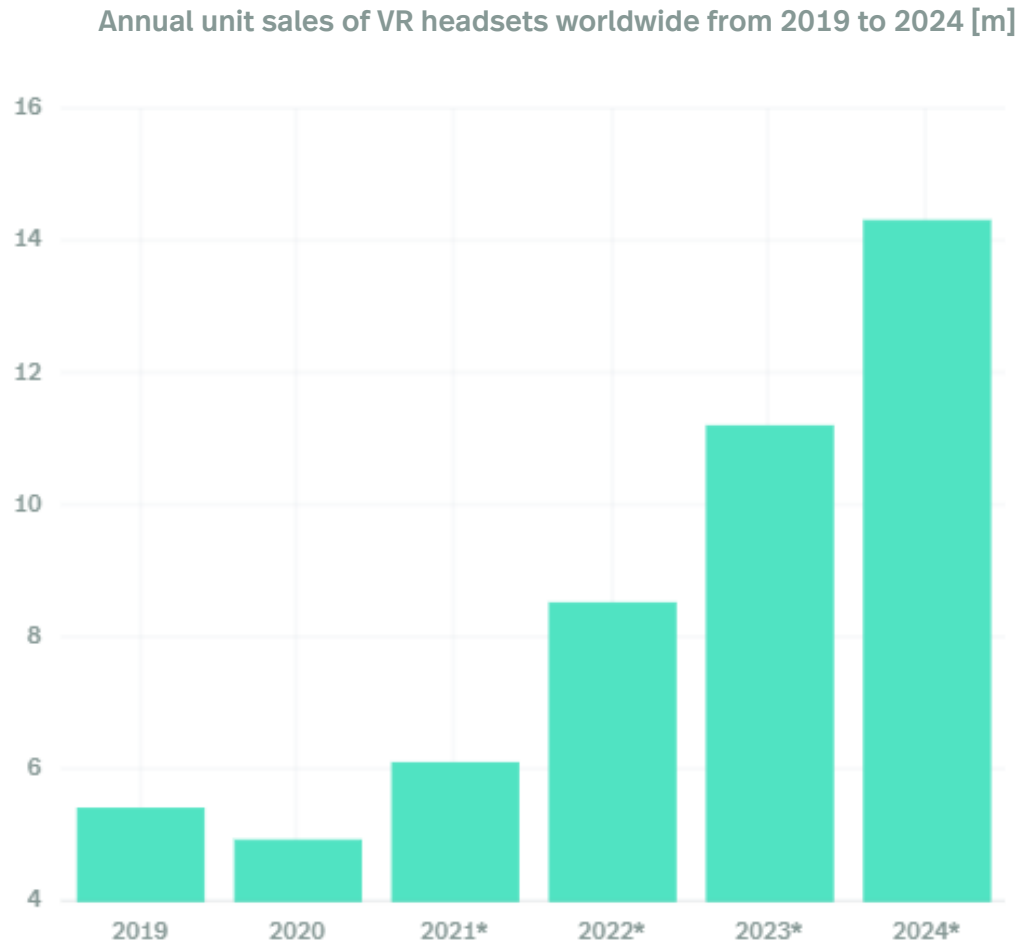
1)Source: Wunderman Thompson

Virtual reality headsets are the gateway to the metaverse, and their worldwide unit sales are steadily increasing

Virtual reality (VR) is a digital experience that simulates a 3D environment in the real world. The technology provides users with an immersive experience using VR tools such as headsets, gloves or glasses

VR has revolutionized the entertainment and gaming industry by allowing users to immerse themselves in a highly simulated environment. Furthermore, there is an increasing use of VR in instructional training, such as for teaching pilots, engineers, mechanics, field workers, soldiers, and technicians in the manufacturing and oil and gas sectors, propelling the market growth

VR headset sales are expected to increase by more than 20% p.a. over the coming years, indicating a high likelihood that the user base for metaverse solutions will also grow fast



1)Source: Creative Blog

The competitive problems of Web 2.0 also carry over into Web 3.0 – The market is already dominated by a few major players

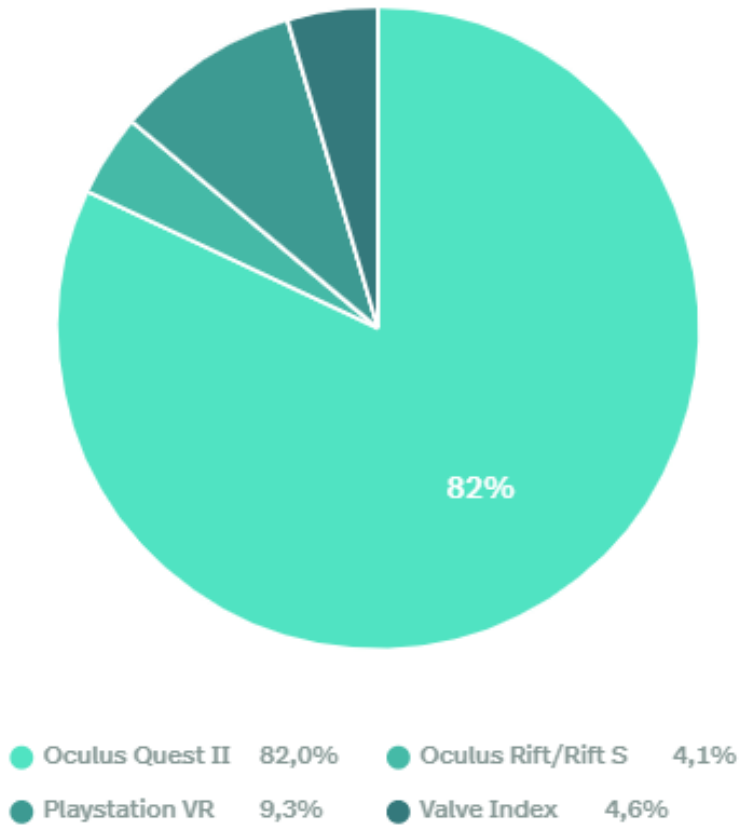
The competitive landscape in the Web 2.0 has been subject to major discussions, as few major players dominated different fields of the "old" web. These problems seem to transfer to the Web 3.0, as the market was already highly concentrated in 2020

As of today, Meta, formerly known as Facebook, is already a major player in the VR sector. The company's VR empire includes the top-selling hardware provider Oculus, the leading VR app store Quest, seven of the most successful developers, and one of the best-selling apps of all time

In the fourth quarter, Oculus comprised for more than 85% of VR headset sales, with only two noteworthy competitors, namely Sony and Valve

1)Source: SuperData Research

Sales of top-selling virtual reality headsets worldwide in Q4 2020 [%]



08 - Key Takeaway

Web 3.0 and the metaverse have the potential to fundamentally revolutionize the internet as we know it – Europe should not miss out on being part of this evolution

09 Policy

Concrete recommendations for action for a future-ready digital economy in Germany and Europe

Talent for the future: Support startups, simplify equity participation for employees, promote diversity

The European Commission should push for rules that make it easier and more attractive to grant employee stock options across the continent; at the same time, German policymakers should act now to enable better employee ownership programs, such as by establishing a new class of shares for GmbHs

The EU should follow the example of France and establish a common framework to encourage the introduction of special tech visas in all member states

Diversity is key to broadening the base of entrepreneurs, especially female founders and funders. Thus, we encourage EU governments to directly link their funding instruments to VC funds that address diversity

Capital for growth and employment: Further improve access to late stage capital, strengthen exit channels and the equity culture

We encourage European governments to boost the expansion of successful scaleups and create major leverage for later stage investments, such as a "German fund for the future."

European policymakers should aim at driving venture capital mobilization through a harmonized legal framework that makes exit channels in Europe more attractive

We suggest that the German government considers increasing employee stock participation by gradually modernizing the German pension system. Employees, foundations and pensioners benefit from good returns, and both established companies and startups obtain more capital to finance their growth

Fair competition for innovation and growth: Regulate platforms, strengthen decentralized and interoperable single sign-on regimes

The Digital Services Act is an important tool to fight digital disinformation and online hate speech if users get full and easy control over the information they receive. Given that it will be enforced at the national level, German policymakers must give their digital services coordinator the resources it needs

The Digital Markets Act is a watershed moment for fair competition in the internet economy, but it also requires ongoing resources and political will. We urge European policymakers to give the European Commission additional resources to adequately enforce the DMA, and we also urge the German government, specifically the Federal Ministry for Economic Affairs and Climate Action, to work closely with the Commission and support the DMA's goals

5G boosts innovation and new business models and therefore its potential should be leveraged by competitive telecommunications markets

The best way to innovate and evolve a viable 5G ecosystem is to support and safeguard competition between established market players and new entrants at every step of the value chain

A broader frequency spectrum should be made available for the use of 5G as well as for the increasing needs of future mobile communication services

Furthermore, European policymakers should encourage software-defined technologies, like Open Access Radio Networks, to strengthen both competition and digital sovereignty

The next internet economy is here. Europe needs to ensure it has global champions in the emerging Web 3.0 and metaverse realms

Instead of just being first to regulate Web 3.0/DeFi, Europe also needs to be first to foster a booming innovation ecosystem that supports a newly decentralized and open web

Should the metaverse take flight as a new economic and social engagement zone like many predict, Europe must ensure there are interoperable systems with open platforms and competition. Otherwise its strong sectors like gaming and music will again be at the mercy of a handful of non-European hardware gatekeepers

The End

We hope you enjoyed our 2022 report

Get further information on the website

GO TO WEBSITE