Outlook 2024

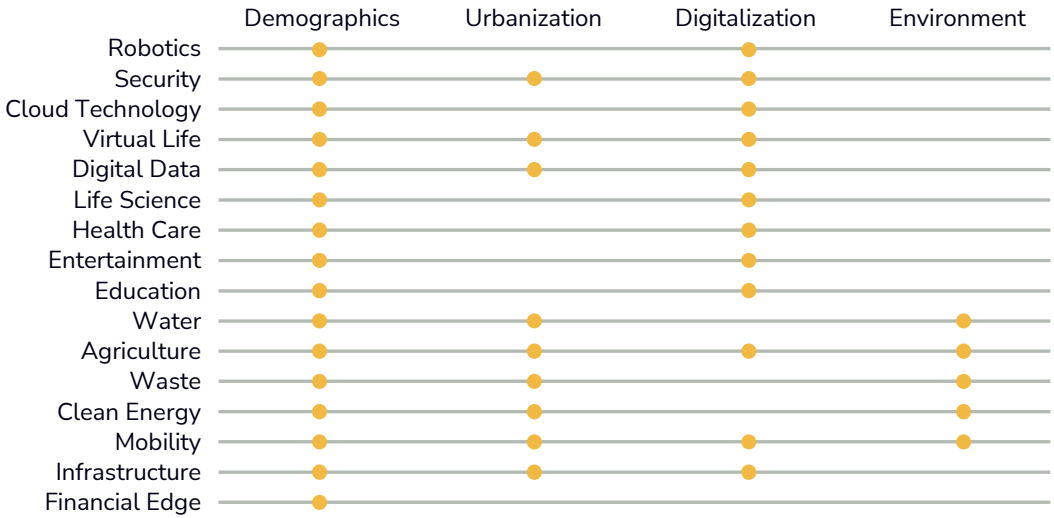
Themes

11 December 2023

SIGNET

Megatrends and themes
The future is now

Megatrends — long-term changes that transform our lives



- We have identified megatrends — structural and long-term changes that transform our lives.
- **Demographic** changes are characterized by a growing world population, increasing longevity, increasing quality of life and the importance of human capital, as well as changes in generational preferences.
- **Urbanization** implies the growth of cities and their densities.
- **Digitalization** is about the increasing importance of digital data,the softwarization of processes, and an increased focus on productivity.
- **Environmental** changes denote the growing necessity for sustainable use of natural resources.
- Then we identify **16 themes** that are synchronized with the development of these trends: Robotics, Security, Cloud Technology, Virtual Life, Digital Data, Life Science, Health Care, Entertainment, Education, Water, Agriculture, Waste, Clean Energy, Mobility, Infrastructure, Financial Edge.

Robotics. Market
Humans' little helpers

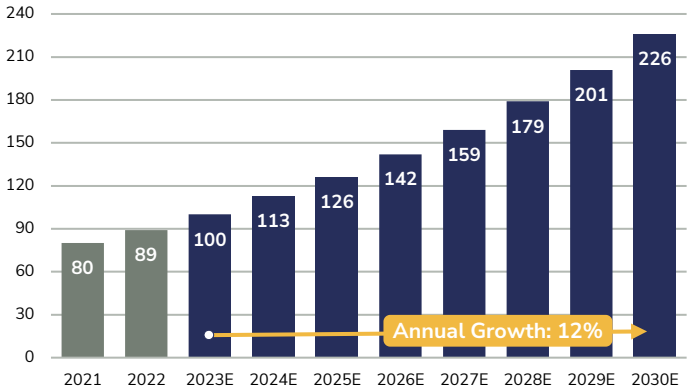
Overview

Robotics has become an integral part of the modern digital revolution, leading to some pragmatic changes in all industries and sectors. With an aging population in developed countries, robotic automation has now become a very relevant technology, and most tasks in industry, healthcare, agriculture, and other areas are being automated to reduce human effort, cost, and time.

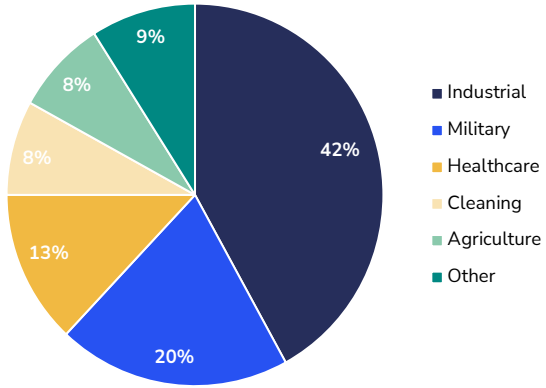
- The global robotics market is projected to be $113 bn in 2024, and it is likely to reach a landmark of $180 bn in 2028 with a CAGR of 13.5%.
- The current number of robots operating in factories around the world is the highest in history. Robots are now increasingly being used by professionals in industry and services. Data shows a record of 2.7 mn industrial robots operating in factories around the world.
- Among all the sectors, a 1% increase in robot density correlated with an increase in productivity of 0.8 %. The highest productivity gains were seen in industries where companies were in the preliminary stages of adopting robots. These industries witnessed a 5.1 % increase in productivity, with an increase in industrial robot density of 1%. The number of working hours of the employees decreased by 2.7% with robot adoption.
- A recent MIT study found that each robot added to the workforce has the effect of replacing 3.3 jobs, while Oxford Economics asserts that robots will replace 20 mn manufacturing jobs by 2030. It is expected that around 861 000 public sector jobs will be attributed to automation by 2030.
- Also, according to a new workforce study, between 400 - 800 mn workers worldwide will be displaced entirely by automation by 2030, while as many as 375 mn workers will need to quit their occupation and switch to a more in-demand field.
- At the same time, technology innovation, especially in semiconductors, IoT, and computing algorithms, helps to reduce the average cost of all types of robots, especially industrial ones. Based on recent data, the ongoing CAGR of cost decrease is 9% p.a. All that results not only in efficiency, but also saves money in CAPEX and increases workers' salaries.

Charts source. (1—6) IFR.

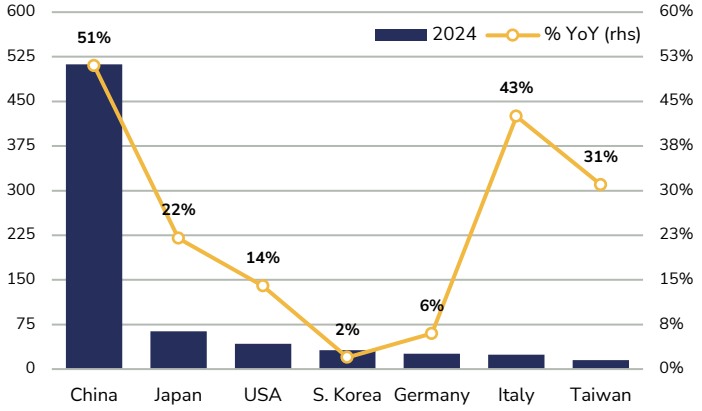
1. Global robotic market, $ bn



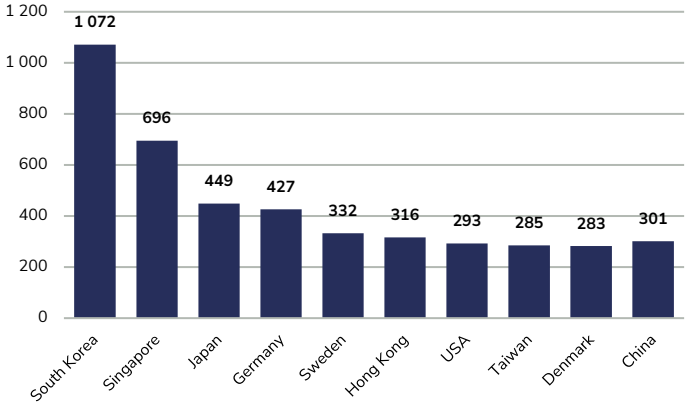
2. Robotic revenue share by segment in 2024, %



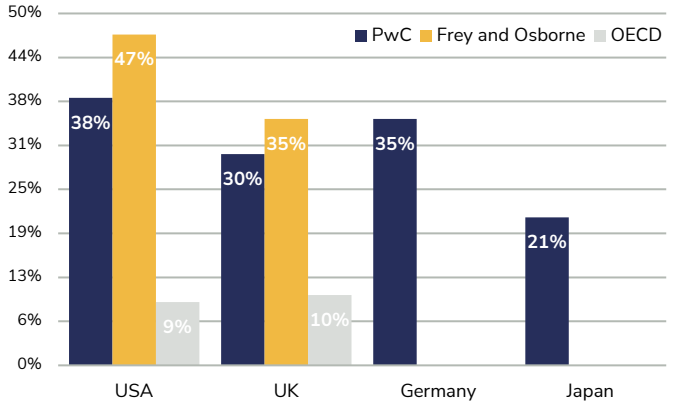
3. Installations of industrial robots, '000 units



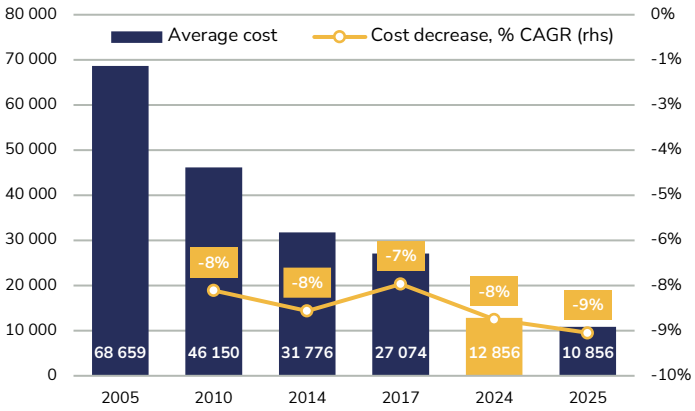
4. Robot density in 2024, units / 10 000 workers



5. Share of jobs at risk by 2030, as of 2017



6. Average cost of industrial robots, in $



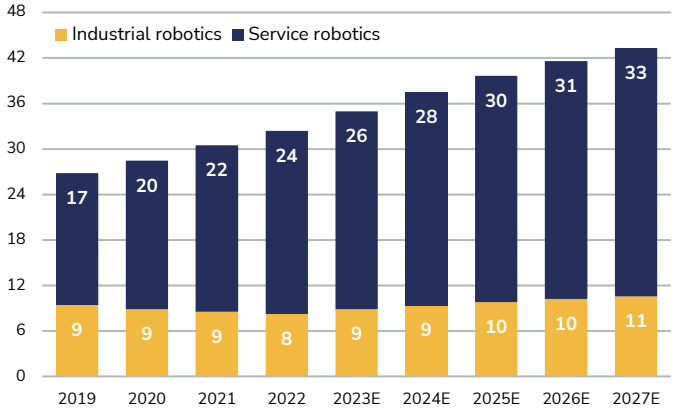
Robotics. Segments They are everywhere

Overview

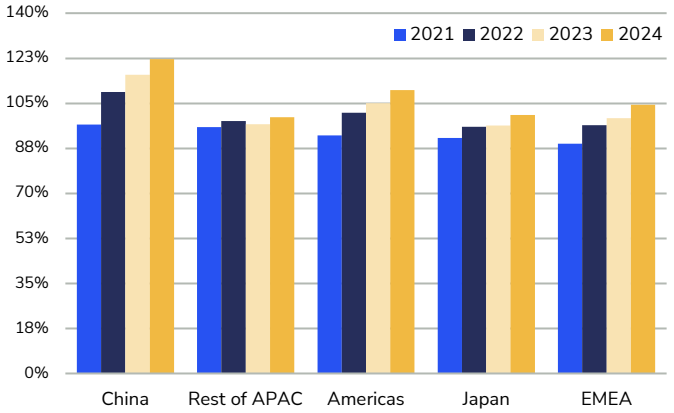
The use of robots is more widespread than we may think.

- **Industrial Robots.** The global market for industrial robots is expected to be valued at $35.2 bn in 2024. Factors such as increased demand for automation, the high cost of human labor, governmental support, and the advancement of R&D will push the market value to grow at a CAGR of 12.1%.
- The **food robotics** market is estimated to grow to $6.6 bn in 2027 from $4.6 bn in 2024 with a CAGR of 13.1%. Now, over 90 000 robots are in use in the global food and beverage manufacturing industry, picking and packing confectionery or placing different toppings on fresh pizzas or salads. Around 37% of these robots are in Europe.
- **Collaborative Robots**. The global collaborative robot market value will be $3.3 bn in 2024 with a sales volume of 51,100 units. The market is expected to grow in the future with a CAGR of +40%.
- The **Automotive** segment is leading the market by end-user with a projected share of around $312 mn in 2024 and predicted to reach $447.8 mn by 2027 with a CAGR of nearly 12.3%.
- The United States dominated the market with the highest share of around $190 mn in 2024, followed by China ($11 mn)
- **Mobile Robots.** Mobile robots have one of the fastest-growing markets in the robotics industry, with a CAGR of 21%, based on a report from Next Move Strategy Consulting. The market value is estimated to be $21 bn in 2024 and is predicted to reach $72.5 bn by 2030. The growth of the market will be widely driven by the growing e-commerce sector, an increase in manufacturing automation, mass personalization of goods, and a shortage of low-cost labor.
- GlobalData estimates the **global drone** market will be worth $91 bn by 2030, up from $24.7 bn in 2024, growing at a CAGR of 19.8%.
- Logistics and passenger drones market will likely enjoy the most robust compound annual CAGR of 78.6% and 34.5% between 2024 and 2030. Defense drones will face modest CAGR growth of 7.8%, reaching $10.82 bn in 2024 and $17 bn in 2030.
- **Medical Robots.** The global medical robotics market is projected to reach $124.81 bn by 2028 from $87 bn in 2024 at a CAGR of 9.33%.
- The **surgical robot** market is projected to reach $7.5 bn in 2024, is expected to grow at a CAGR of c.15.8%, and will exceed $20.98 bn by 2030. There were close to 1.5 mn robotic-assisted surgical procedures that were performed in the U.S. in 2023. Over the last 10 years, about 7.5 mn robotic procedures have been performed in the U.S. across the different surgical specialties. In almost 67 countries across the globe, more than 10.2 mn robotic surgeries have been completed in the last 10 years.
- The **hospital robotics** market is valued at $11.4 bn in 2024, is expected to grow at a CAGR of 14%, and will reach $20 bn by 2028. 185 500 hospital robots were installed in 2023.
- The **nursing robotics** market is expected to reach $440 mn in 2024, with a CAGR of c.20%, and will reach $1.5 bn by 2030. Over 99 500 Nursing robots were installed in 2023.

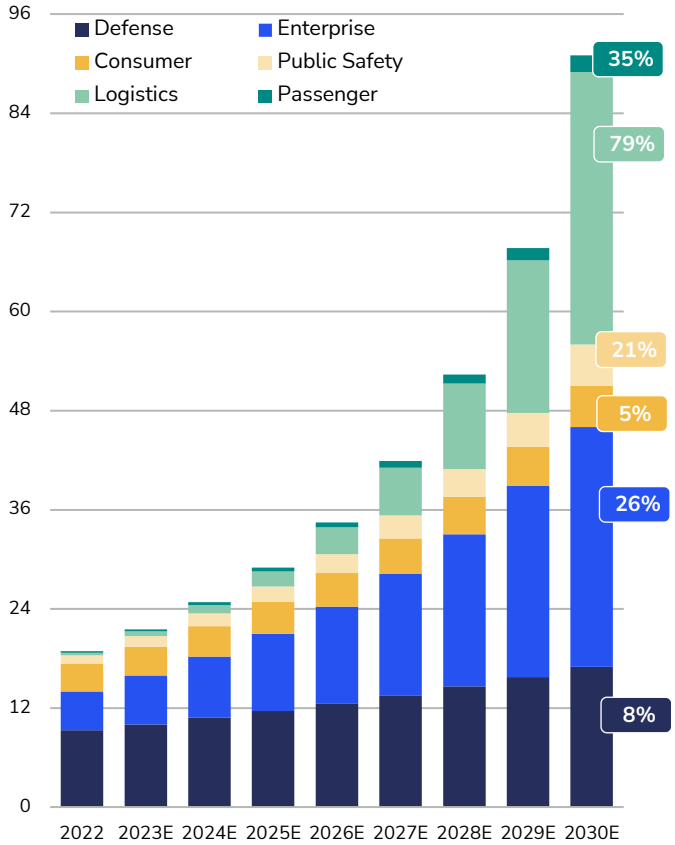
3. Robotics manufacturing by type, mn units



1. Shipments of industrial robots ’21—’24, %



2. Industrial robots market by segment, $ bn



Charts source. (1) IFR, (2) Next Move Strategy Consulting.

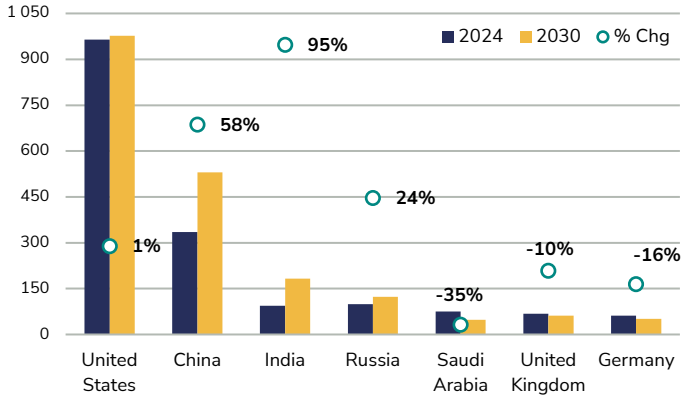
Security
To the new frontiers

Overview

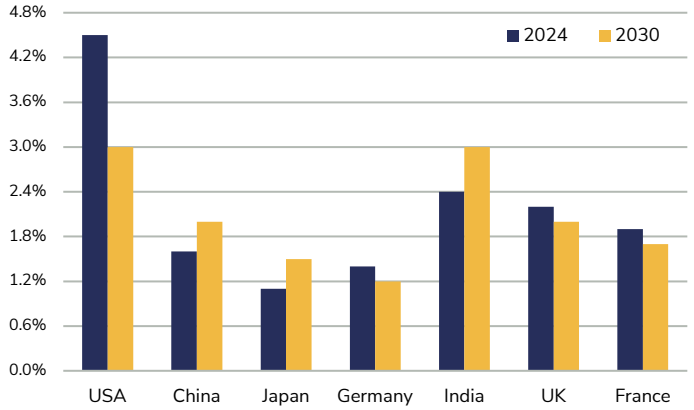
Based on projections, the global aerospace and defense market will grow from $855 bn in 2024 to $1055 bn in 2024, at a CAGR of 6.9% until 2027. As regionalization has started to grow, countries all around the world will only increase their spending on defense and security.

- **Military Aircraft and Systems.** This segment includes combat and non-combat aircraft and related systems, such as fighter jets, bombers, transporters, helicopters, missiles, and drones. Based on projections, the market size of this segment in 2024 can be estimated at $198.7 bn, the U.S military aircraft and systems market is expected to grow at a CAGR of 2.4% from 2023 to 2028.
- **Space Systems and Equipment.** Based on projections, the market size of this segment in 2024 can be estimated at $56.6 bn, the U.S space systems and equipment market is projected to grow at a CAGR of 10.2% from 2023 to 2028.
- **Ground Defense.** Based on projections, the market size of this segment in 2024 can be estimated at $46 bn, the U.S ground defense market is projected to grow at a CAGR of 3% from 2023 to 2028.
- **Shipbuilding.** Based on projections, the market size of this segment in 2024 can be estimated at $38 bn, the U.S shipbuilding market is projected to grow at a CAGR of 4% from 2023 to 2028.
- Some of the developing and disruptive technologies that are shaping and challenging the defense security market are artificial intelligence, machine learning, blockchain, cloud computing, internet of things, biometrics, quantum computing, and 5G networks.
- The global **defense cybersecurity** market size was valued at $16.45 bn in 2024 and is projected to grow to $46 bn in 2030, at a CAGR of 15.8%.
- **Artificial Intelligence and Analytics** in the Defense market is expected to grow with a CAGR of over 13% during 2024—2027 and reach $ 37 bn in 2030, compared to $ 16.45 bn in 2024.

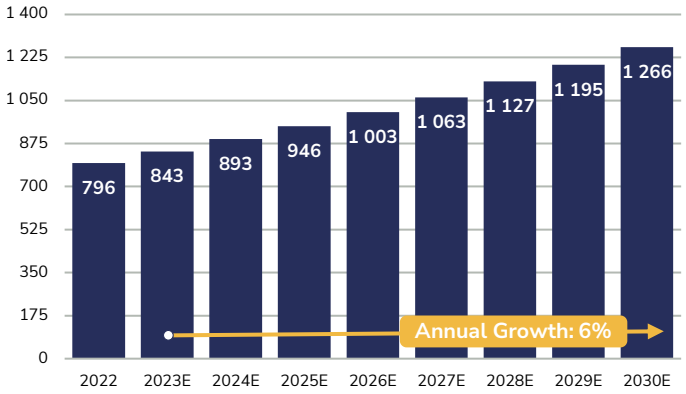
1. Defense budgets, $ bn



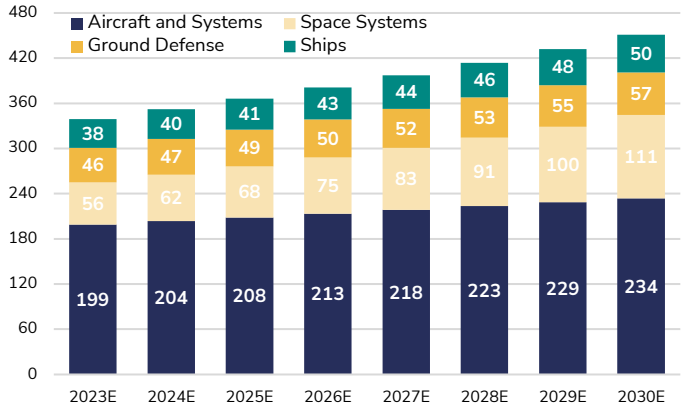
2. Defense expenditures, % of GDP



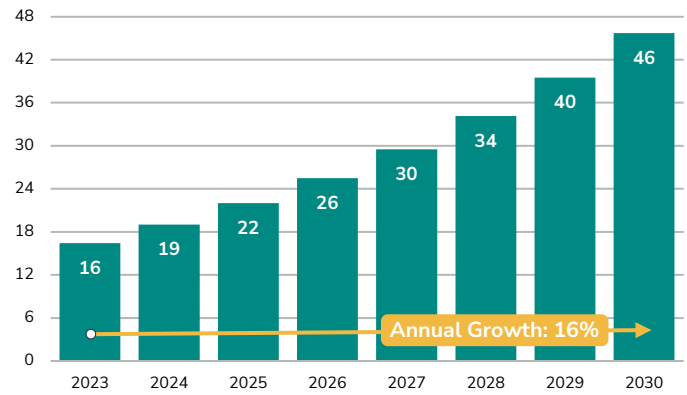
3. Global aerospace and defense market size, $ bn



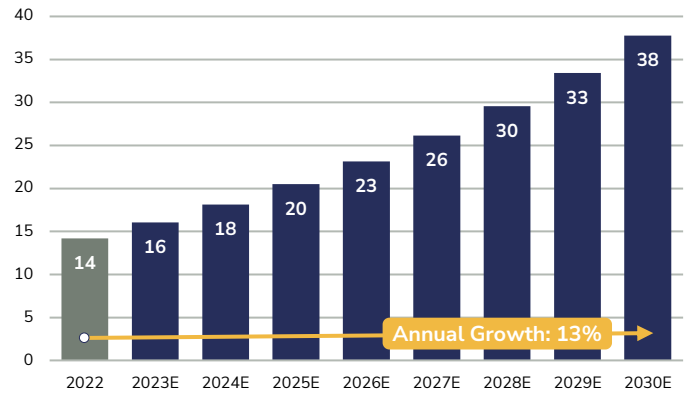
4. US defense segments market size, $ bn



5. Global cybersecurity market in defense, $ bn



6. AI and analytics in defense market size, $ bn



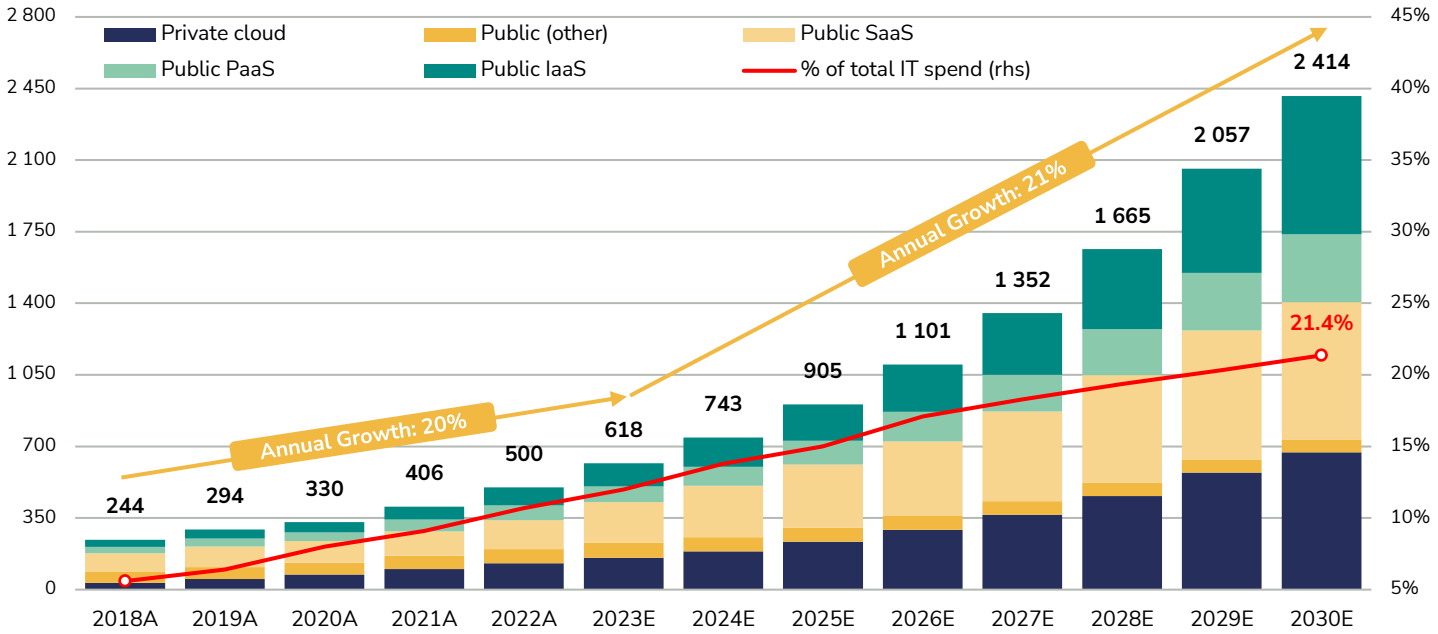
Charts sources: (1) IFR, (2) SIRR, (3) Statista, (4) National security journal

Cloud technology
It is all about AI. Part 1

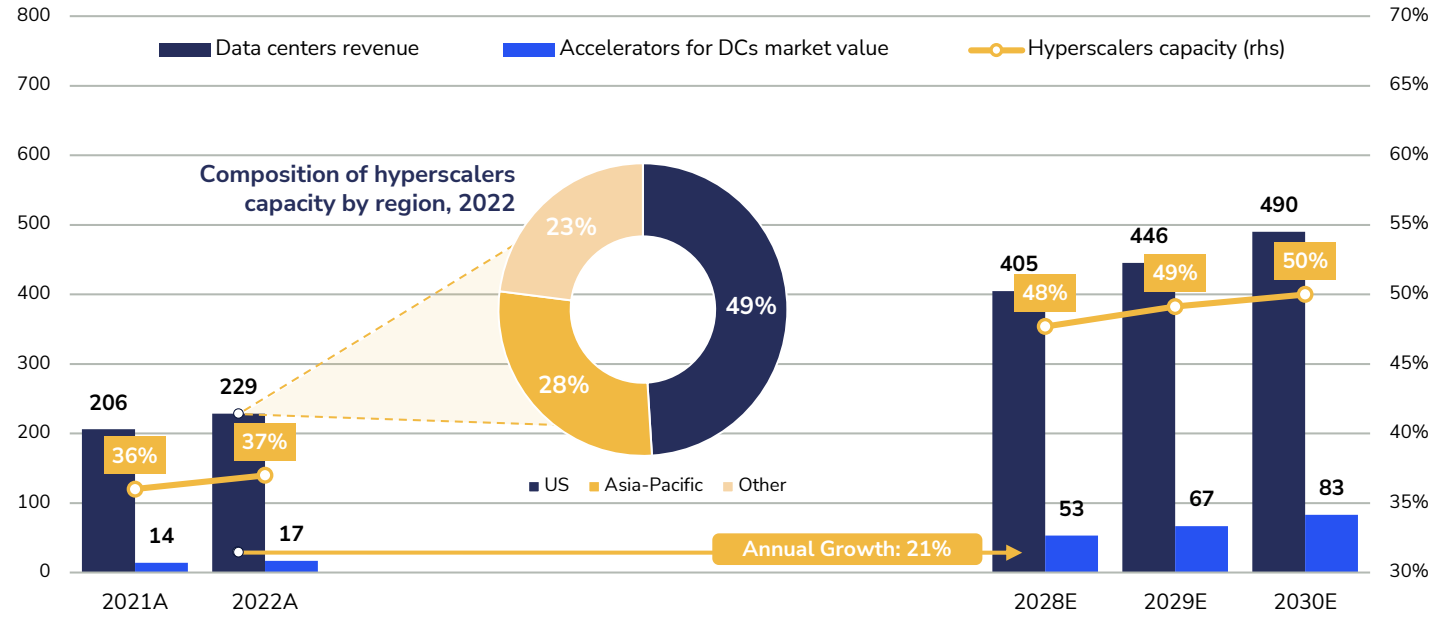
Overview

- **The cloud is going mainstream.** Despite the rapidly growing popularity of the cloud, there is still more room for growth, as the share of corporate data stored in the cloud will accelerate from 76% in 2023 to 89% in 2026. Currently, demand for Public cloud solutions dominates in nominal terms (c.67% of total sales), but Hybrid cloud and, in some cases, Private cloud are expected to increase their presence from 33% in 2023 to 40% in 2026[1]. Big Tech remain the major players in the cloud market, with over 50% share.
- **Cloud computing growth to remain high.** Cloud computing growth rates are expected to be in the mid-teens to low-twenties in the next 5—10 years[1]. The global IaaS public cloud market grew by 30% in 2022 and is expected to maintain a similar high growth pace (CAGR c.21% YoY) by 2030. The three major IaaS providers are Amazon (c.40% market share), Microsoft (22%) and Alibaba (8%). Apart from this, the multi-cloud becomes more and more popular, while the multi-cloud management market (companies like VMware, now part of Broadcom) is expected to grow at a CAGR of 28%.
- **Further AI adoption will accelerate the edge-to-cloud movement**. Currently, AI deployment is still in the early phase, but it is growing rapidly. Interest in adopting AI solutions among enterprises rose by 13% YoY in 2022 and is forecast to grow by c.25% in 2023. Global enterprise adoption of AI is projected to grow at a CAGR of 37% until 2030. Such projections are undoubtedly transforming hyperscalers into critical infrastructure units, while their capacity on the consolidated data center market is expected to rise from 39% to 50% by 2030.
- **The competition among chips for data centers intensifies.** Currently, Nvidia dominates the AI chip market with a share of c.85%. Meanwhile, Big Techs are also expanding into this market and proactively becoming hardware players. Amazon offers its customers Inferentia and Trainium, as an alternative to Nvidia's GPUs. Alphabet has also introduced its new Cloud TPU v5e, which is a combined training and inference product. Still, analysts expect NVIDIA to increase its market dominance up to 95% and maintain it. Market to demonstrate a c.21% CAGR by 2028[2].

1. Cloud market dynamics by subsegment, $bn



2. Global data centers market revenue and accelerators for DCs market value, $bn



Notes: (1) Gartner, McKinsey (2) AWS, Rackspace , Citi Bank

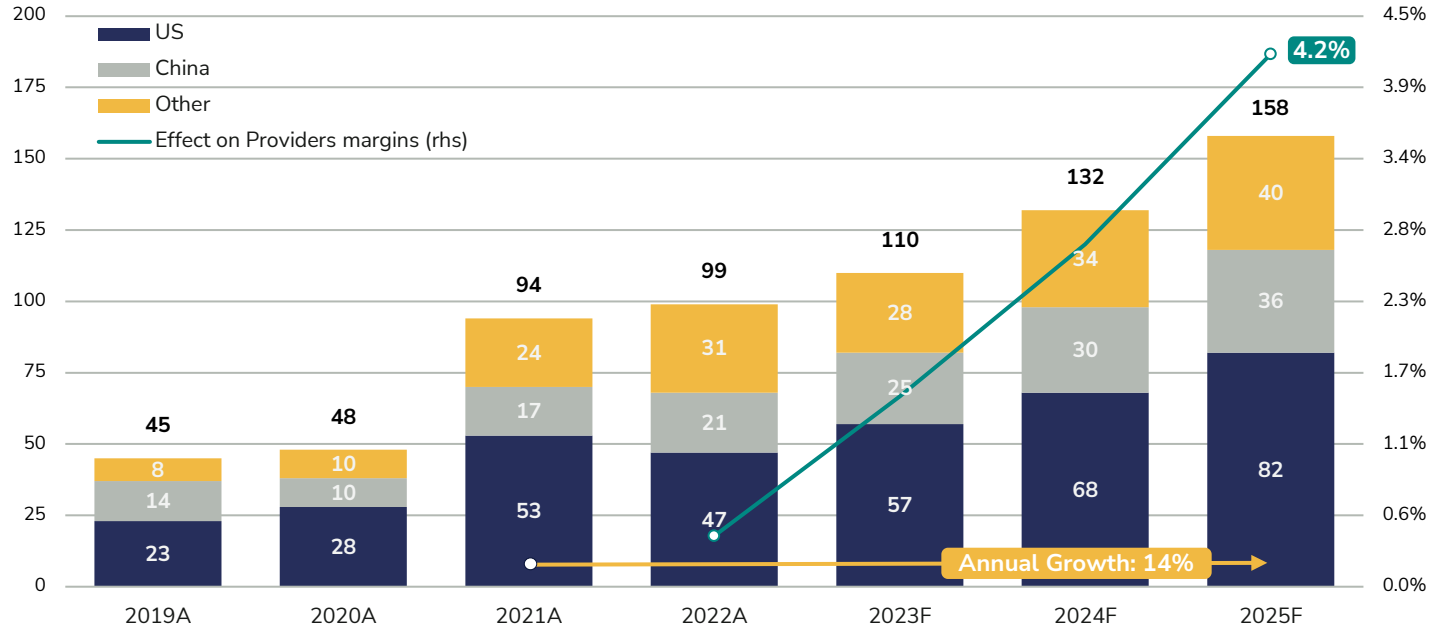
Virtual life
It is all about AI. Part 2

Overview

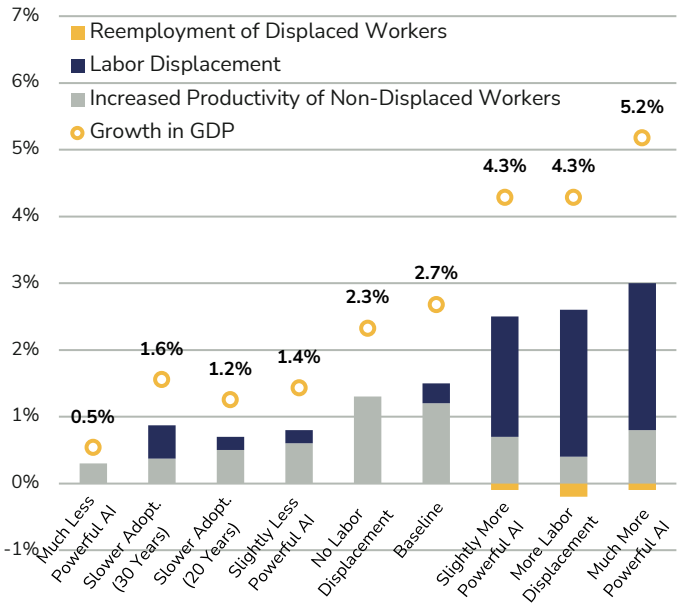
Tech giants, taking advantage of pricing power and larger budgets, will be key beneficiaries of further AI adoption, online ad market recovery, and other positive long-term trends.

- **Accelerating AI adoption is driving global GDP.** Global investments in AI could reach $200 bn by 2025, while private investments in AI could rise from $99 bn in 2022 to over $158.4 bn in 2025 (according to various sources, this could lead to a gain in US GDP of 0.4% to 2.5% in the long term), boosting US corporate margins by 4% by 2030. Up to 10% of US firms will adopt GenAI by 2025. Productivity growth will remain a key contributor to GDP acceleration, adding 0.2—0.6% to global GDP in the long run.
- Generative AI could boost both top-line growth and margins expansion. Average sales boosts for different industries could range from 1.6% to 2.7% and $2.6-4.4 bn in nominal terms. GenAI could accelerate sales productivity by 3—5% of sales expenditures.
- Total AI revenue will rise at a CAGR of c.41% YoY and reach $1.3 trln by 2032, and approximately 12% of total technology spend. The largest beneficiaries will be GenAI IaaS providers ($247 bn by 2032) used for training LLMs, digital ads with embedded AI solutions ($192 bn) and specialized generative AI assistant software, including copilots ($89 bn).
- **Digital ads: on the way to recovery.** Global advertising expenditures to reach $727.9 bn in 2023 (+3.3% YoY). In 2024 the global ad market is expected to grow by 4.7%, up to $762.5 bn, with a further 3.8% acceleration in 2025. The share of digital ads is expected to rise from 63% in 2023 to 68% in 2025. AI to become a long-term growth driver, the with share of AI-enabled ads in total composition rising to 80% by 2032.
- **E-Commerce.** The global e-commerce market is expected to total $2.9 trln in 2023 and to demonstrate a CAGR of c.9% by 2032. This growth is driven by shifts in consumer behavior, propped up by competitive pricing and a wider range of products available online.

1. Private AI Investments by region and possible effect on margins, $bn



2. AI effect on labor productivity growth and GDP



3. AI-Enabled Ad Revenue by Medium, $bn

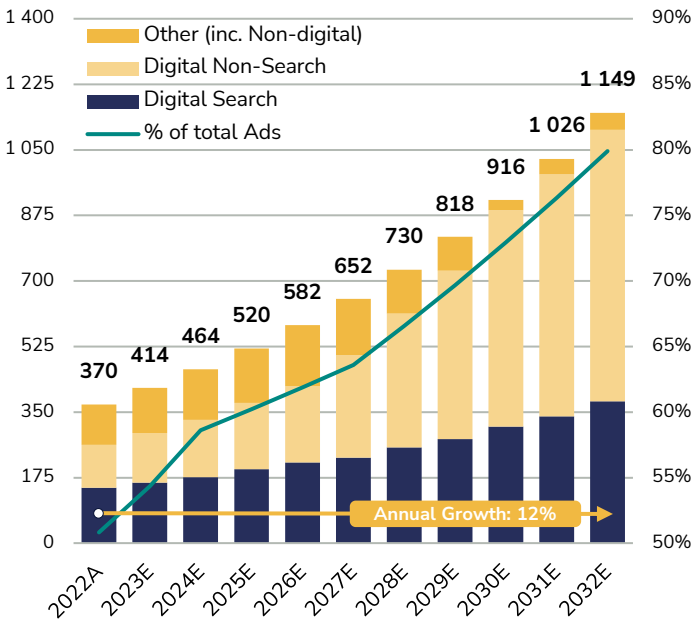


Chart sources: (1) One of Top-3 Strategy Consultants (2) One of top Global Media Agency's (3) One of Top-10 Investment Banks

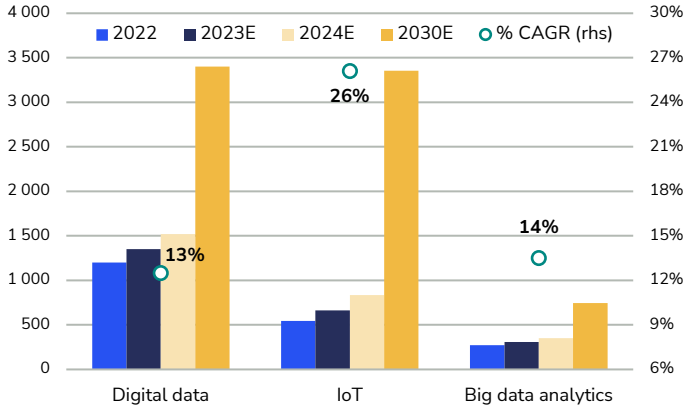
Digital data. Market
It is all about AI. Part 3

Overview

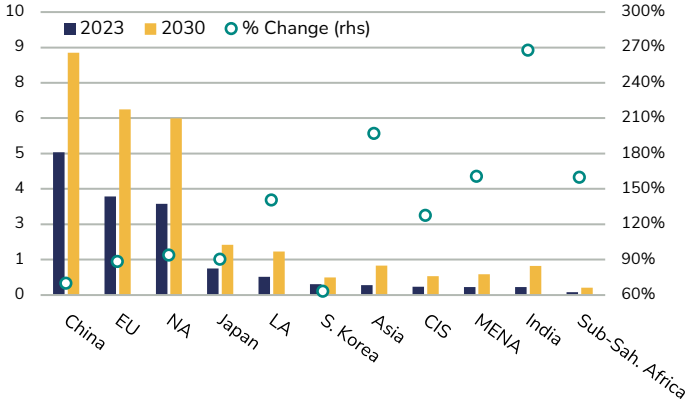
We are moving from the digital revolution to a data revolution, creating a digital data universe in which data infuses our everyday lives, the decisions we make, and the way we behave. The rapid adoption of advanced technologies, such as AI, IoT, cloud computing, Web3, and blockchain, is driving rapid growth in the global digital data. Enterprises are shifting from traditional businesses to adopting technologically advanced solutions that aid market growth.

- **The global digital data market** is expected to grow from $1.35 trln in 2023 to $1.55 trln in 2024, at a CAGR of 12.5% until 2030.
- The latest data indicate that there are now more than 5.18 bn individuals using the internet, equating to 64.6% of the world's population. Kepios analysis reveals that 147 mn people started to use the internet in the last 12 months. The increasing number of individuals using the internet increases the amount of storage needed. The worldwide number of active social media "user identities" reached 4.90 bn by the end of 2023. Now it is close to 60% of the world's population. Social media use continues to grow too, with 150 mn new user identities over the past year delivering annual growth of 3.2%.
- The latest data published in Statista's Digital Market Outlook shows that worldwide spending on video-on-demand (VOD) services increased by 7.6% YoY, with global spending amounting to almost $110 bn for 2024 as a whole.
- The IDC predicts 172 zettabytes of new data will be created annually by 2024, up from 42 zettabytes in 2018. Global DRAM market size will be $97 bn in 2024 and will grow at a CAGR of 3% to 2027, NAND market will grow at a CAGR of 11% and will reach $76 bn in 2024.
- **The global digital transformation market** is projected to expand from $2.27 trln in 2023 to $2.76 trln in 2024, growing at a CAGR of 21.6% for the period since 2023 to 2030. Machine learning and the IoT will be commonplace, spawning their own data from the data they ingest. The global machine learning market was valued at $31.4 bn in 2023, and it is expected to reach $43.7 bn in 2024, at a CAGR of more than 39%, from 2023 to 2028.

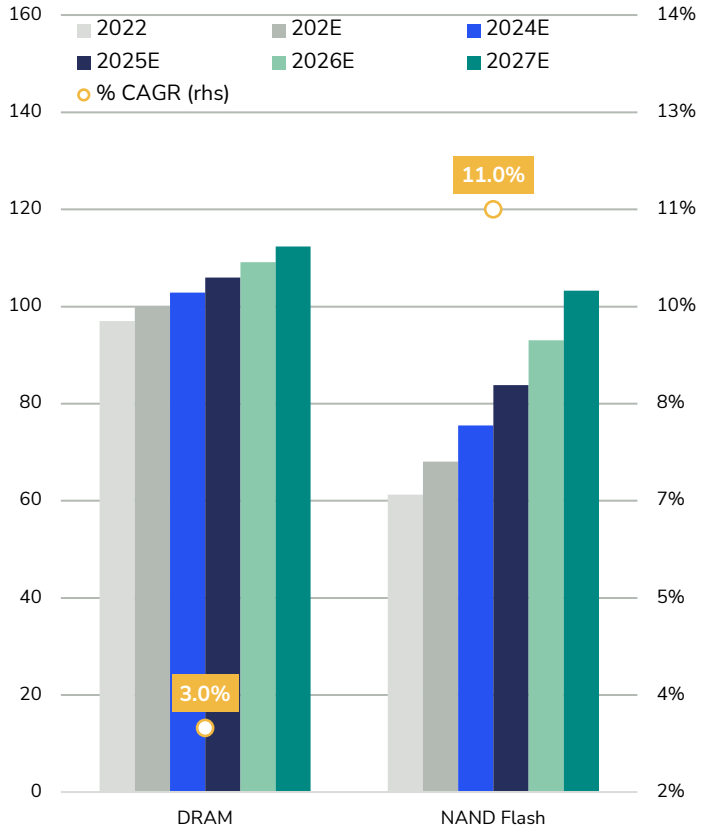
1. Market size, $bn



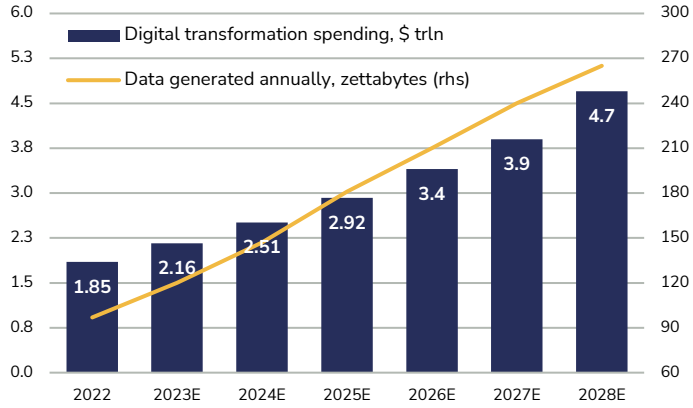
2. Global number of IoT devices, bn units



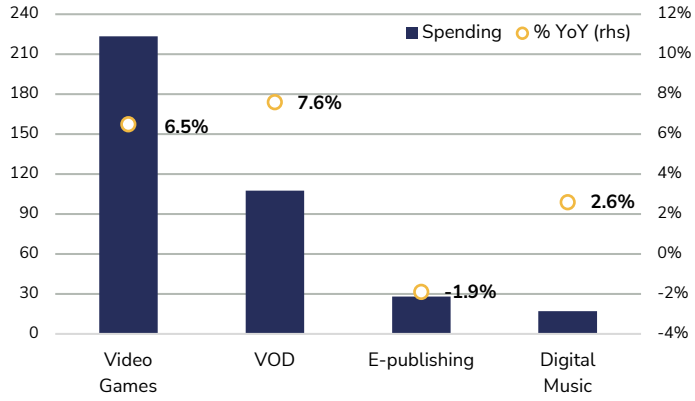
3. Storage market worldwide 2022-2027, $bn



4. Digital transformation and data generation



5. Digital spending in 2024 and YoY change, $bn



Charts sources: (1) ICD, (2) Kepios research, (3) Statista digital market outlook

Digital data. Trends
All the data in the world

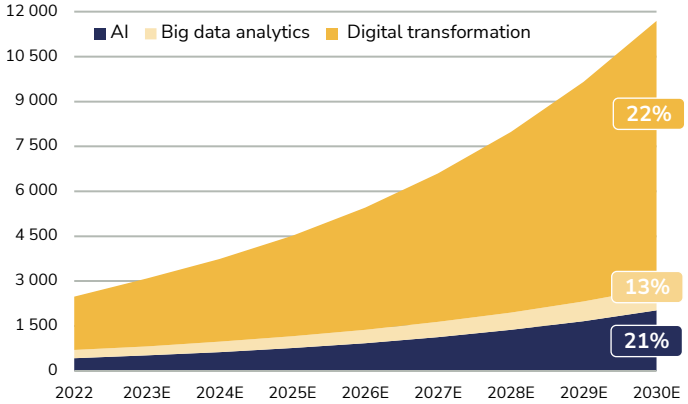
Overview

Big data analytics, AI, and digital transformation are probably the most powerful trends in the world now.

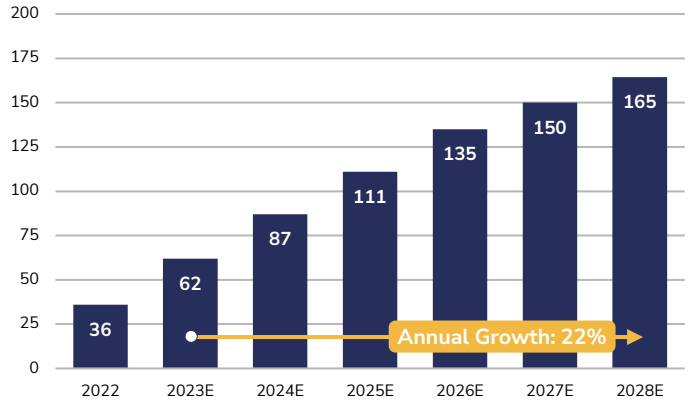
- The global digital transformation market is projected to grow to $2.7 tn in 2024 and reach $8.92 tn by 2030 (CAGR 21.6%).
- The global AI market size is projected to grow to $627 bn in 2024 and reach $2 025 bn by 2030 (CAGR 21.6%).
- The global big data analytics market size is projected to be $349 bn in 2024 and $745.2 bn in 2030 (CAGR 13.5%).
- PwC: GDP could be up to 14% higher in 2030 due to AI (contributing up to $15.7 trln to the global economy — $6.6 trln from increased productivity and $9.1 trln from consumption-side effects).
- These are the trends for 2024 in AI: Automated Machine Learning (AutoML); AI-driven Conceptual Design; Multi-modal Learning; AI-Powered Cybersecurity; Enhanced Language Modeling; Computer Vision; Democratized AI
- Overall, the global combined AI/ML market size is expected to grow from $113 bn in 2023 to $159 bn by 2024, growing at a CAGR of 40% till 2030.
- The global digital twins market size, which involves creating virtual replicas of physical objects, systems, or processes using digital data, is expected to grow from $11.5 bn in 2023 to $16.4 bn in 2024, at a CAGR of 42.6% from 2023 till 2027.
- **Web 3.0** is one of the most recent Internet technologies, combining ML/AI and blockchain to provide personalized and intelligent services and content. Web 3.0 will allow individuals to not only own and control their data, but also to get reimbursed for their online time. Web 3.0 will redefine data ownership and privacy, giving users more control over their personal information and how it is used.
- The global Web 3.0 market is valued at $2.5 bn in 2023 and is projected to be $3.7 bn in 2024, growing at a CAGR of 46.7% from 2023 to 2030. The global data privacy software market size is forecast to grow from $8.9 bn in 2023 to $11 bn in 2024, growing at a CAGR of 25%, according to a report by Gartner.

Charts sources: (1) IFR, (2) GS, (3) Gartner

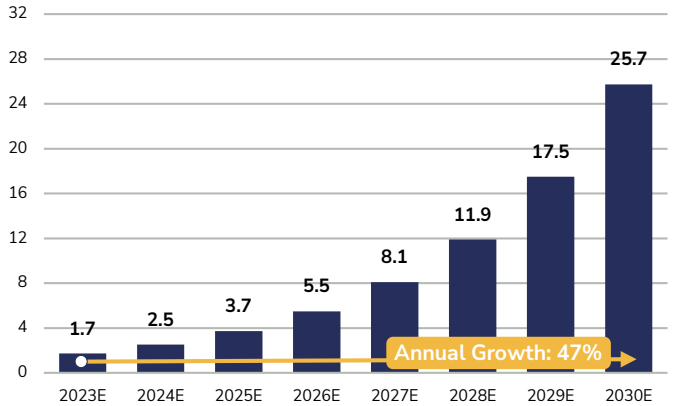
1. Global market size, $bn



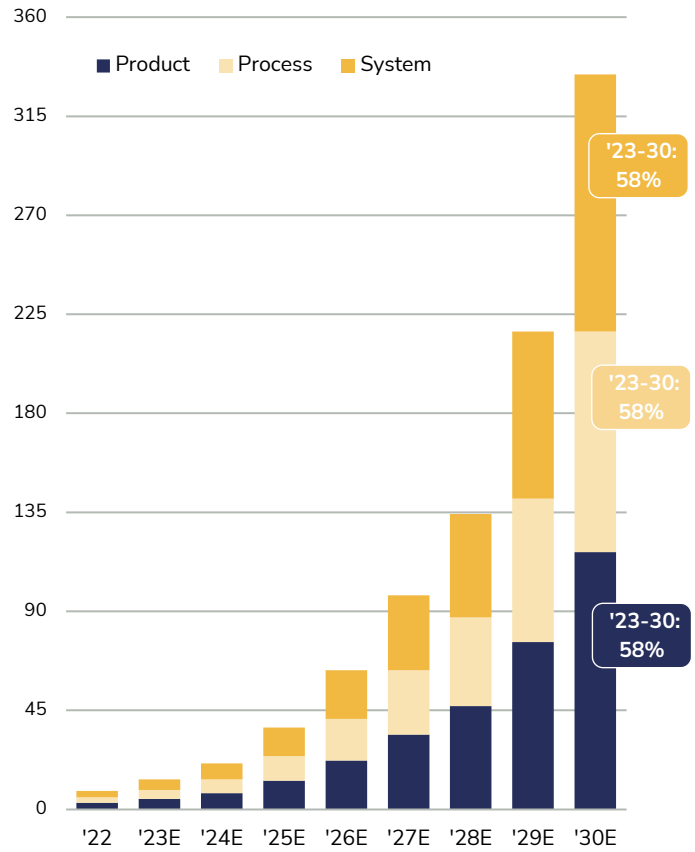
2. Global ML-as-a-Service market size, $bn



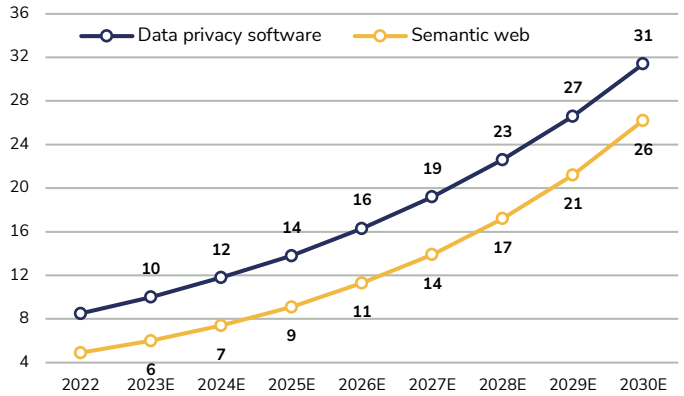
3. Web 3.0 annual revenue, $bn



4. Global digital twin market size, $bn



5. Data privacy/semantic web market size, $bn



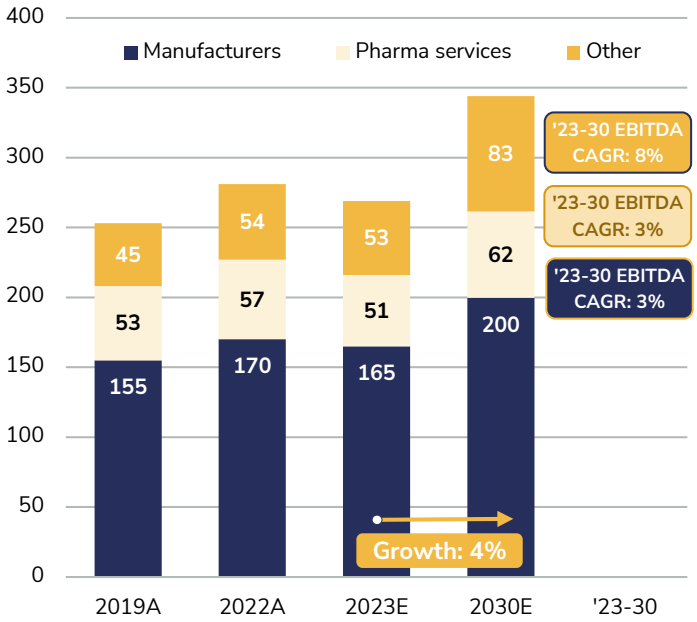
Life science
AI to accelerate growth

Overview

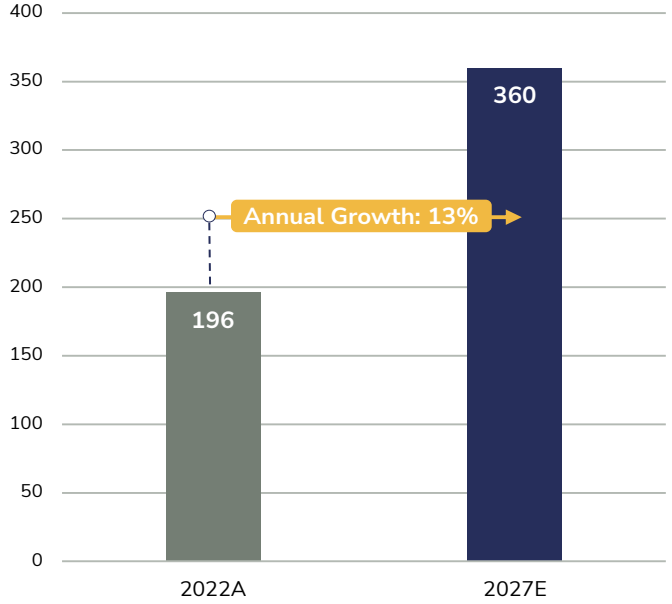
In the life science area, software solutions providers and pharmaceutical companies that are effectively managing their costs are among our top picks in the healthcare field.

- **Artificial intelligence.** Following other industries, Life Sciences also perceives the positive effects of AI implementation. Artificial Intelligence will also play its increasing role in manufacture. In this field, c.75% of majors say AI is a priority investment in 5 years.
- **Genetic data trading.** Another positive tailwind in the life sciences area is the declining cost of genome sequencing. This will help to decrease the costs of genome data selection and analysis. Illumina (with its NovaSeqX) and Ultima Genomics (private, its solution is UG100) are undisputed leaders in this area.
- **Pharmaceuticals.** To stay competitive, pharmaceutical companies will have to invest in Capex, R&D, and digital transformation much more. Overall, pharma expenditures are poised to rise in the upcoming years.
- Despite rising R&D costs (for example, the cost to take a drug candidate from discovery stage to market launch hit $2.3 bn, +10% YoY), R&D ROI decelerated to an almost 13 years low (c.1.2% in 2022). As this tendency could negatively impact manufacturers' businesses, CROs (like IQVIA, Labcorp) and software providers (like Veeva, Cerner) will most likely benefit from it.
- Demand for drugs against obesity (CAGR to '27 +25%) and oncology (CAGR to '27 +13%) is growing most dynamically. From this perspective, such providers as Novo Nordisk and AbbVie should remain top performers. Another major tendency in this market is the rapid growth of biosimilars.
- Overall, the **medical devices** market faced several challenges, including supply chain disruptions, raw material price increases, labor cost increases, and an inability to pass price increases through to customers.
- Healthcare software has the potential to capture significant value within healthcare systems around the world, contributing to annual cost savings of $1.5—3.0 trln by 2030 via a range of innovative solutions such as remote monitoring, AI, and digitalization.

1. Life Sciences EBITDA by subsegment, $bn



2. Global cancer drugs market value, $bn



3. Global obesity drugs market value, $bn

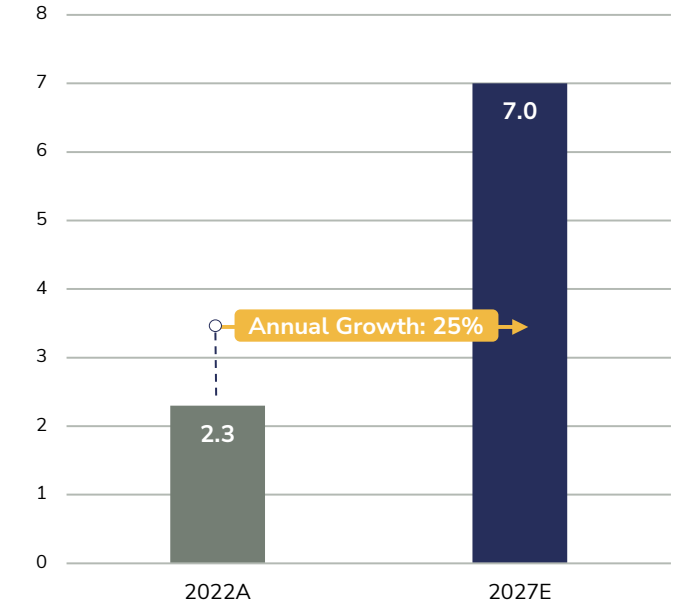


Chart sources: (1) Company reports, forecast by Signet (2,3) One of Top-3 Strategy Consultants

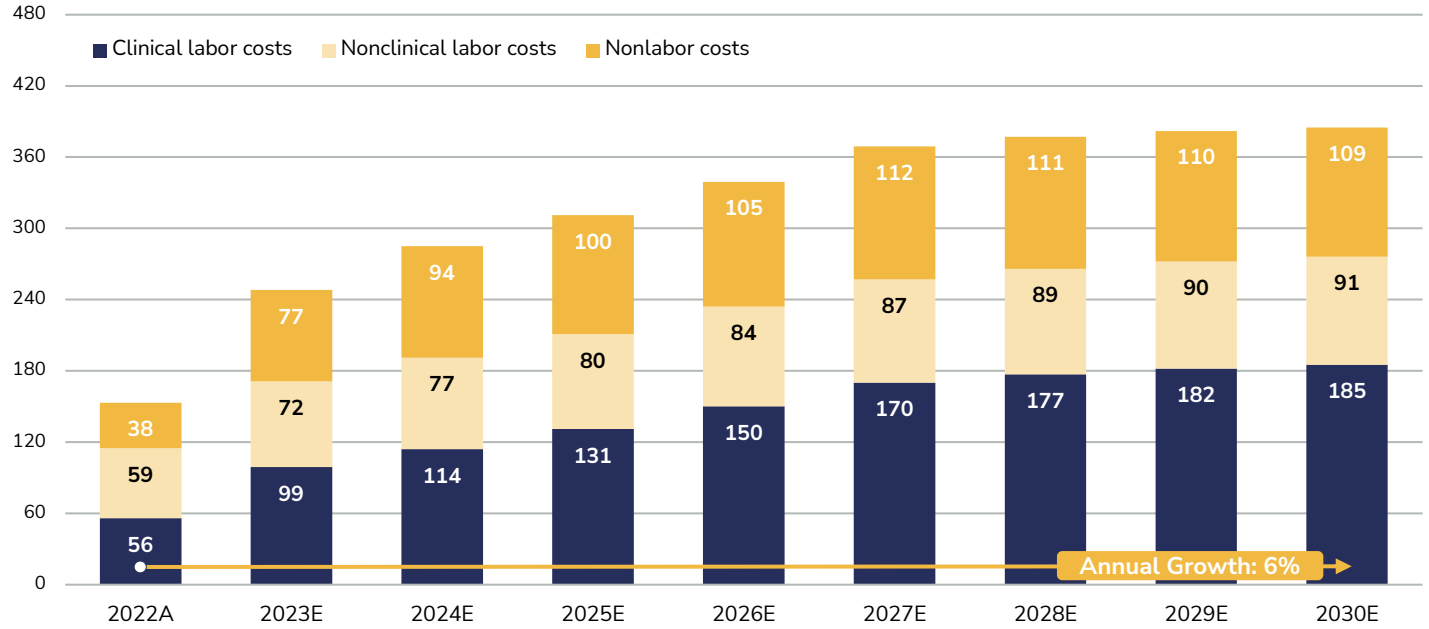
Health care
Focus on long-term value creation

Overview

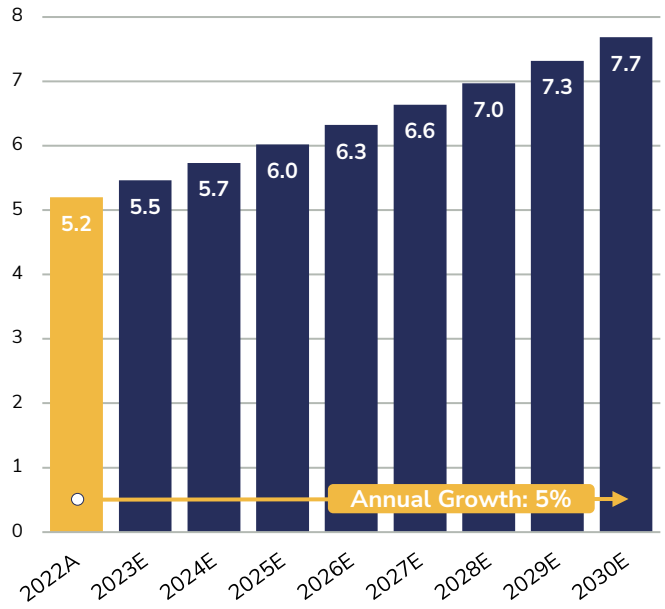
Interest in value-based care continues to rise, while regulatory scrutiny intensifies, with cuts in Medicare coverage and PBM reform on track. All this, in conjunction with rising medical loss ratios, creates different consequences for players and providers while still maintaining substantial upside for both groups.

- **Healthcare services: on the way towards value-based care (VBA).** VBA involves paying for medical care for the achieved treatment result. As it increases customer acquisition and loyalty while simultaneously minimizing costs (as well as increasing business marginality), most of the payers are rapidly increasing their footprint in the VBA market. CMS now expects all traditional Medicare beneficiaries to be treated by a provider using a value-based care model by 2030. Undisputed leaders are Optum, HCA, Kaiser Permanente, Tenet.
- **Medical costs** to accelerate in 2024 (on average, experts expect medical costs to rise c.7% YoY in 2024 vs. 6.0% in 2023 and 5.5% in 2022). This is already reflected in EBITDA. Major sources of inflation remain largely the same: rising prices for new and existing drugs, workforce shortages, and physician consolidation can further amplify the effect. Additionally, the commercialization of COVID-19 vaccines will also mildly intensify inflationary pressure in 2024.
- **Medicare reform**: current changes to the Medicare model imply changes to Part D as part to lower prescription drug prices. Additionally, the new law requires drug companies that raise their drug prices faster than the rate of inflation to pay Medicare a rebate. New regulations for Medicare Part B will provide access to affordable biosimilars. Still, costs must demonstrate stable growth.
- **Medicaid redeterminations.** The majority of payers said, that despite substantial changes in Medicaid coverage in 2024 the impact for their sales structure and marginality to be neutral or low.
- Overall, rapid **growth in the over-65 population**, increased adoption of Medicare Advantage (44% in 2021, forecast to grow to 52% by 2030 amongst the Medicare population), and improved profitability of managed Medicaid will increase demand for managed services.

1. Projected US healthcare costs, $bn



2. National health executive spending, $trln



3. Healthcare EBITDA by subsegment, $bn

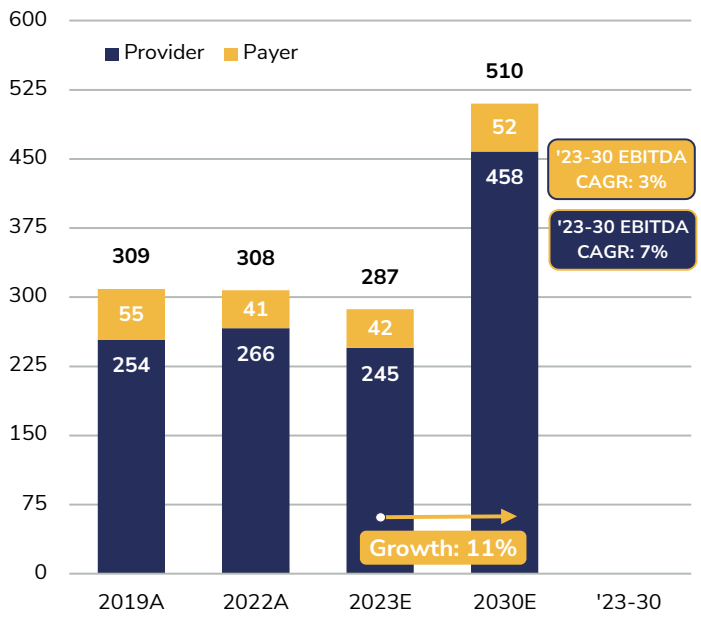


Chart sources: (1) Company reports, forecast by Signet (2) One of Top-3 Strategy Consultants (2,3) Center for Medicare and Medicaid Services

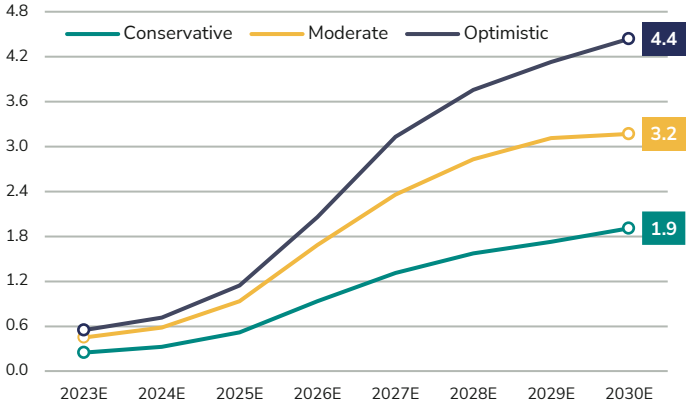
Entertainment. Market and trends
Have fun!

Overview

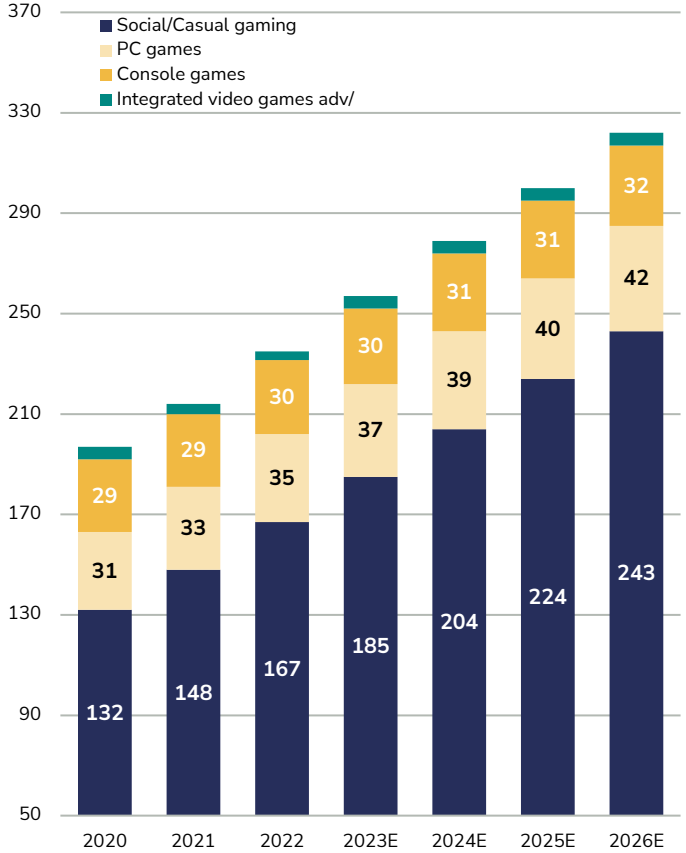
The entertainment industry is a dynamic sector that encompasses a range of sub-sectors such as filming, television, music, and gaming.

- In recent years, the industry has seen significant growth, driven by the increasing popularity of digital content and the expansion of streaming services. To understand industry's importance, we should know only one number — approximately 6.9% of the total US GDP comes from the media and entertainment industry, and this percentage only seems to be growing.
- **The total global media and entertainment industry** is projected to reach $2.7 trln in 2024, up from $2.5 trln in 2023, at a CAGR of 6.2% from 2023 to 2027, driven by the growth of digital media, according to PwC.
- The entertainment industry, encompassing gaming, gambling, tickets and experiences, and the metaverse, presents compelling investment opportunities.
- With the projected growth rates and emerging trends in these segments, investors can capitalize on the increasing consumer demand for interactive and immersive entertainment experiences.
- In 2024, the primary market for developers of online games and gaming hardware might reach $400 bn, with the remaining chances coming from live entertainment and social media
- **Continued growth of streaming:** streaming services are already dominant players in the entertainment industry, but their importance is likely to continue to grow over the next decade.
- The global streaming market is projected to grow at a CAGR of 21.0% between 2023 and 2028, reaching a market size of $500 bn in 2028 (source: Grand View Research).

1. Entertainment TAM by scenarios, $trln



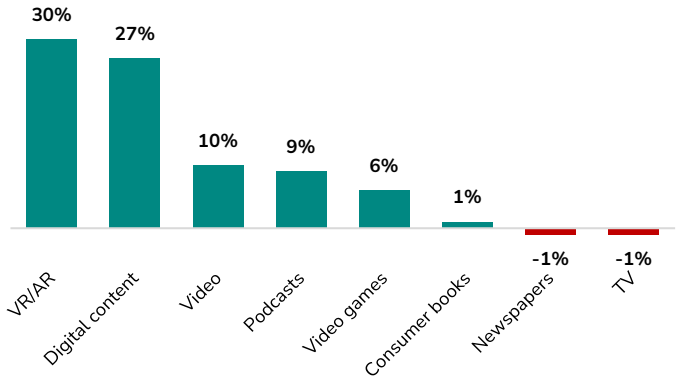
3. Global video games revenue, $bn



Global innovative trends

- **Gaming segment:** gaming industry has witnessed significant growth in recent years, driven by the increasing popularity of video games across various platforms. The global gaming market was estimated at $275.2 bn in 2024 and is expected to grow at a CAGR of 12% until 2026. The gaming market includes software, hardware, and service segments. The software segment accounts for the largest share of the market and is driven by the popularity of mobile, PC, and console games. The hardware segment includes gaming devices such as consoles, PCs, smartphones, tablets, and VR headsets. The services segment includes online platforms, cloud gaming, esports, and in-game advertising.
- **Rise of mobile gaming:** the proliferation of smartphones has led to the widespread adoption of mobile gaming, with a growing number of users and revenues generated from mobile games.
- **Esports and live streaming:** esports has emerged as a major trend, attracting a large audience and generating substantial revenues through tournaments, sponsorships, and media rights. Live-streaming platforms like Twitch and YouTube Gaming have played a crucial role in popularizing esports.

3. Global segments growth 2020-2025, %



Charts sources: (1) Markets&Markets, PwC, Fortune Business Insights

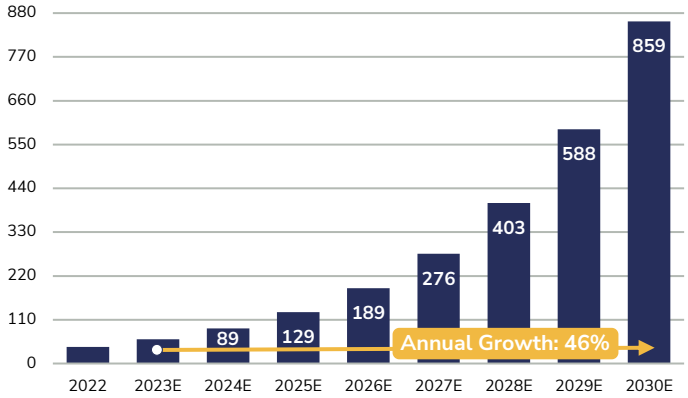
Entertainment. Gaming and metaverse
Second life

Overview

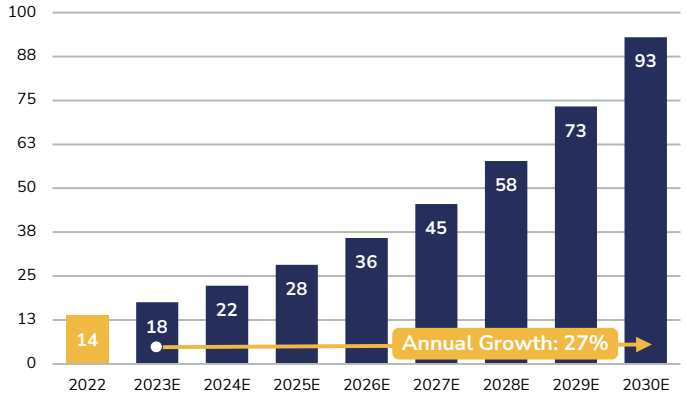
Looking ahead to the next decade, there are several trends that are likely to play a significant role in shaping the entertainment industry.

- **Augmented and Virtual Reality:** adoption of AR/VR technologies is expected to significantly impact the entertainment industry. These technologies have the potential to revolutionize the way we consume and interact with content, and could create entirely new types of experiences for consumers.
- According to a recent report from Strategy Analytics, the installed base of dedicated metaverse devices (VR/AR headsets) worldwide is expected to double from 50 mn in 2022 to 100 mn by 2024.
- The integration of VR and AR technologies in gaming has opened up new opportunities for immersive gaming experiences, with virtual reality expected to play a more significant role in the future.
- The global **AR/VR gaming market** is valued at $16.6 bn in 2024 and is projected to reach $37 bn by 2028 at a CAGR of 30.5%, as per Markets & Markets.
- **Artificial Intelligence:** AI is already being used in the entertainment industry in a variety of ways, such as in content creation, recommendation algorithms, and personalization. As AI technology continues to improve, we can expect it to play an even larger role in shaping the industry in the years to come.
- The global AI in media & entertainment market was valued at $33.4 bn in 2022 and is expected to expand at a CAGR of 26.6% during the forecast period, reaching $137.5 bn by 2028.

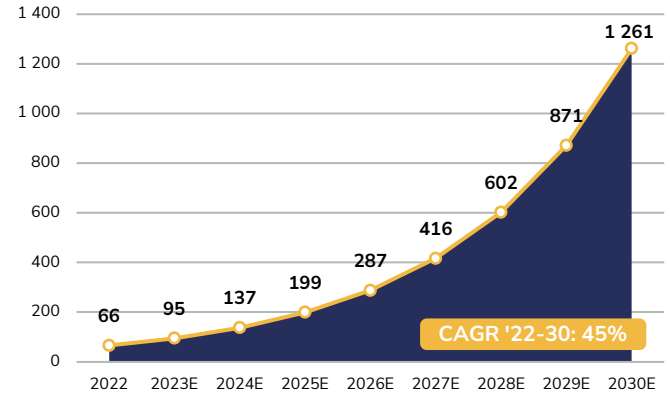
1. AV/VR global market size, $bn



2. AI in Entertainment market size, $bn



3. Metaverse market revenue, $bn



Charts sources: (1) Markets&Markets, PwC, BofA

- **Metaverse segment:** the metaverse, a virtual shared space where users interact with a computer-generated environment and other users, is an emerging concept within the entertainment industry. The metaverse has the potential to revolutionize how people consume entertainment, socialize, and conduct business. The growth of the metaverse market is driven by innovation in gaming technologies, platforms, and experiences; the rise of user-generated content and virtual goods; and the increasing adoption of VR/AR devices and applications.
- The metaverse market is expected to grow at an annual growth rate (CAGR 2023 — 2030) of 36.8%, resulting in a projected market volume of $507.8 bn by 2030 compared to $145 bn in 2024.
- By 2030, the number of users in the Metaverse market is expected to reach 2.633 bn users. User penetration is predicted to be 12.5% in 2023 and is expected to increase to 39.7% by 2030.
- The average revenue per user (ARPU) is projected to be $71 in 2030.
- Bank of America Merrill Lynch stated that the metaverse could become a $1.4 tn market by 2030. They believe that the metaverse has the potential to revolutionize various industries, including gaming, entertainment, e-commerce, and social media.

Key trends

- **Virtual socializing:** The metaverse enables users to socialize, interact, and connect with others in virtual environments, offering new ways to communicate and share experiences.
- **Virtual commerce:** The metaverse provides opportunities for virtual commerce, with users buying and selling virtual goods, services, and experiences within the digital environment.
- **Integration of real-world elements:** The metaverse can integrate real-world elements, such as live events, brands, and celebrities, blurring the lines between virtual and physical experiences.

Entertainment. Gambling and experience
Odds in your favor

Overview

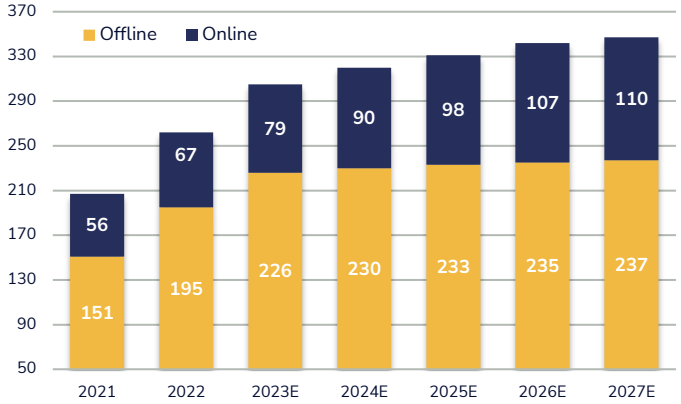
The gambling industry will benefit greatly from digitalization.

- **Gambling:** The global gambling market was valued at $465.8 bn in 2020 and is projected to grow at a CAGR of 6.6% to reach $674.7 bn by 2025.
- The gambling market includes segments such as casinos, lotteries, sports betting, and online gambling. The online gambling segment is the fastest-growing segment and is expected to reach $158.2 bn by 2028 with a CAGR of 11.4%. The growth of online gambling is fueled by increasing internet penetration, smartphone adoption, and the legalization of online gambling in various countries.
- **Global online gambling boom:** Online gambling now accounts for approximately 10% of the worldwide gambling market. Mobile gambling has experienced explosive growth, with over 80% of online gamblers using mobile devices to place their bets. The convenience of mobile gambling has attracted a younger demographic, with millennials and Gen Z being the largest user base for mobile gambling apps.
- **Online poker phenomenon:** Online poker is one of the most popular forms of online gambling, with millions of players competing in tournaments and cash games. The largest online poker tournament to date had over 253 000 participants, creating a prize pool of $27 mn.

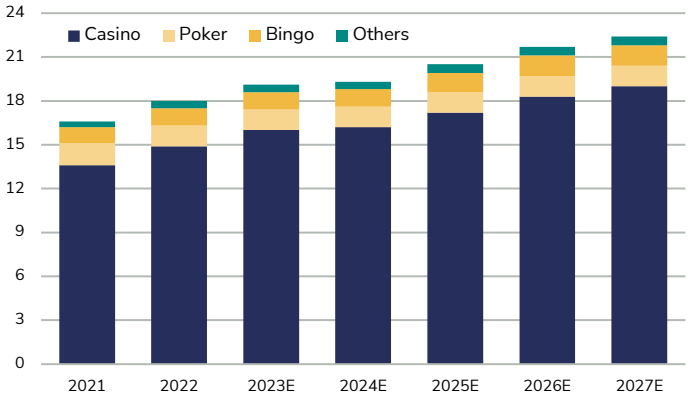
Key trends:

- **Regulation and legalization:** Several regions are relaxing regulations and legalizing online gambling, leading to the expansion of the market and increased revenue opportunities. The UK, Malta, and Gibraltar are among the leading jurisdictions with well-established and regulated online gambling markets.
- **Integration of cryptocurrencies:** The integration of cryptocurrencies, such as Bitcoin, in online gambling platforms has gained traction, providing additional security, anonymity, and ease of transactions for users. The global crypto gambling industry is on pace to reach $93 bn in 2024

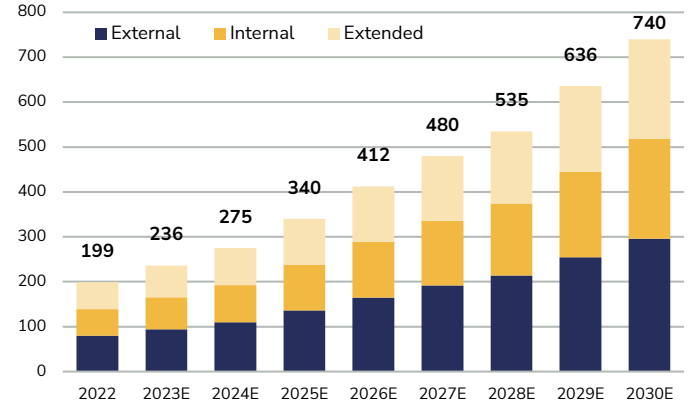
1. Global gambling split, $bn



2. EU and UK Online gambling products, €bn



3. Global virtual event by type, $bn



Charts sources: (1) Markets&Markets, Business Wire

- **Tickets & Experiences.** Segment includes markets such as live music events, sports events, arts & theater events, movies, theme parks, and museums.
- The live music events segment is the largest segment and is expected to reach $55.4 bn in 2024 with a CAGR of 18.9% to 2027.
- The global tickets and experiences market is expected to recover and reach $235.8 bn in 2024, growing at a CAGR of 17.6% until 2027.
- The growth of the tickets & experience market is driven by the increasing demand for live entertainment, digital ticketing solutions, and immersive technologies.
- The global virtual event market reached $244 bn in 2024. It is expected to reach $889 bn by 2032 (CAGR 19.5%, 2023—2032.
- Virtual events refers to events that bring people together digitally. Virtual events can include anything, from small group conversations to panel discussions, fireside chats, direct video broadcast lectures, presentations, or lessons that take place over video.

Key trends:

- **Digital ticketing:** The adoption of digital ticketing platforms has increased, providing convenience, faster transactions, and enhanced security for event attendees.
- **Personalized experiences:** Consumers are increasingly seeking unique and personalized experiences, prompting event organizers to incorporate technology, such as virtual reality and interactive elements, to enhance the overall experience.
- **Hybrid events:** The pandemic has accelerated the trend of hybrid events, combining in-person and virtual elements to reach a broader audience and provide flexibility for attendees.

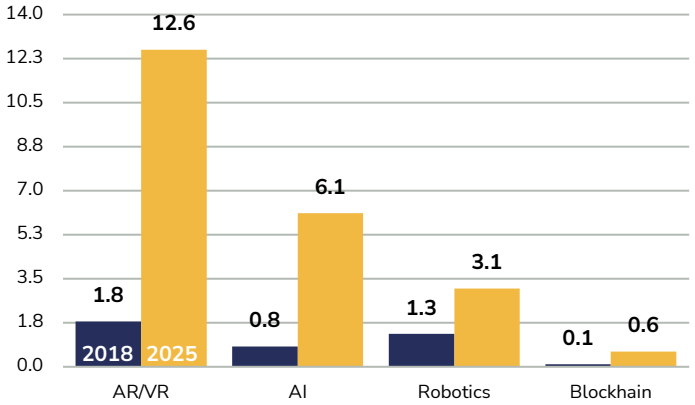
Education
Technology drives changes

Overview

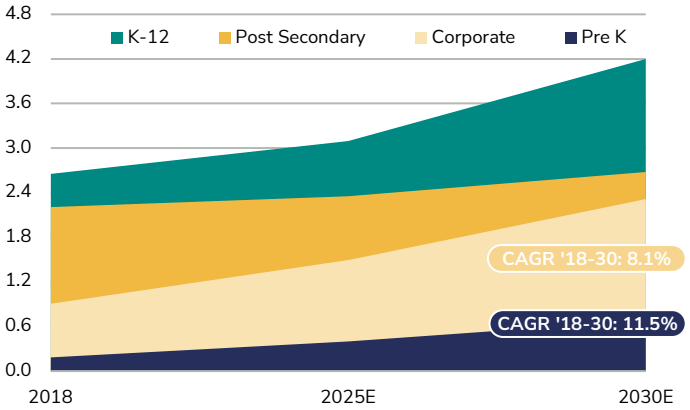
The global education market should see a major increase in the worldwide demand for education, driven by population growth and the changing professional environment. The COVID-19 pandemic has refined traditional education with an accelerated shift to online learning with reduced costs, greater flexibility, and personalization.

- In 2022, global spending on education and training was set at $6 trln, with just 5%, or $300 bn, on digital education expenditures. While North America, with 38%, holds the greatest share in the e-learning market, Asia-Pacific (primarily China and India) is the fastest growing regional market. As for education segments, *K-12* is the largest, with more than 40% of global education expenditure.
- The forecast projects worldwide education expenditure to reach $10 trln by 2030 (CAGR 6.6%), led by a significant boost in spending on *Corporate* and *Pre K* segments. Population growth is a huge driver of the global education market, with almost a billion more secondary and post secondary graduates projected by 2030. Regionally, big growth opportunities are continuously shifting to Asia and the Middle East, with an estimated EdTech market CAGR of 16% (2023—2030).
- **Key players.** At the beginning of 2022, there were nearly 50 listed education companies with a over $1 bn market capitalization. The global market is characterized by strong regional divisions, with Chinese companies like TAL and EDU covering local markets. In North America, COUR and UDMY are two of the biggest MOOCs market leaders. The online language learning landscape is dominated by DUOL, while TWOU is one of the key players in the online higher education degree segment.
- **Profitability.** EdTechs are in an aggressive growth stage and face increased customer acquisition costs, sales expenses range from 20—50% of revenue. The industry is expected to consolidate in the coming years as larger firms seek acquisition opportunities to enhance economies of scale.

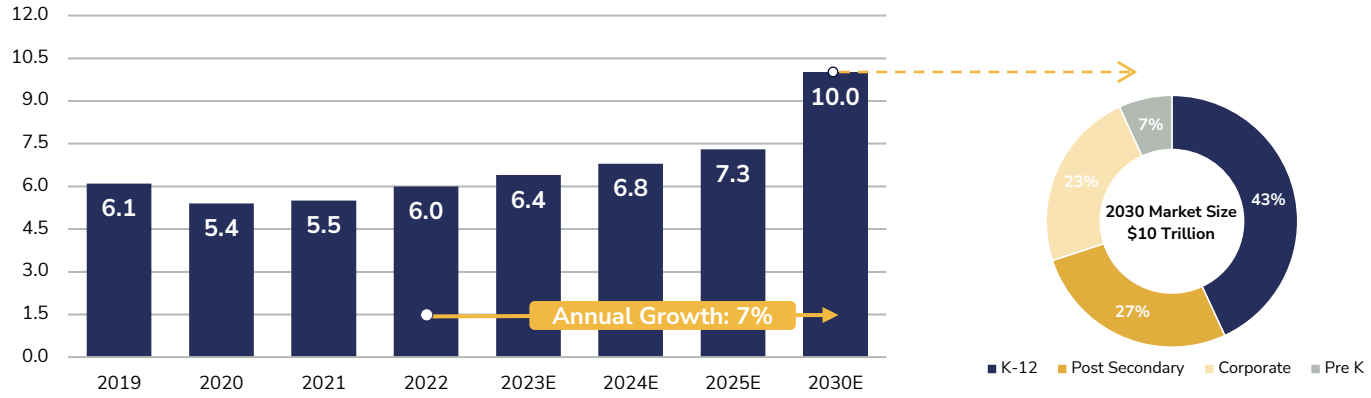
1. Industry spending on advanced technology, $bn



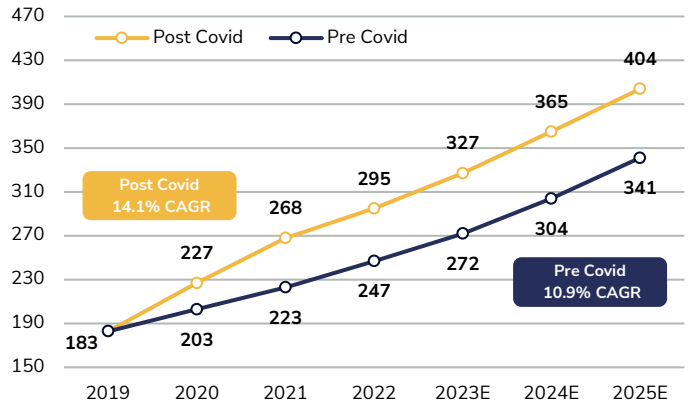
2. Spending growth in key segments, $bn



3. Global education and training expenditure, $trln



4. EdTech market forecast, $bn



5. Coursera user growth, mn users

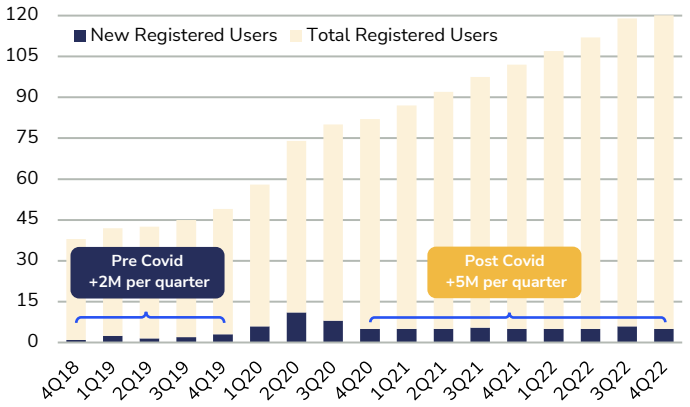


Chart sources: (1) Wittgenstein Centre for Demography and Global Human Capital. (2,3) HolonIQ. (4) Company reports.

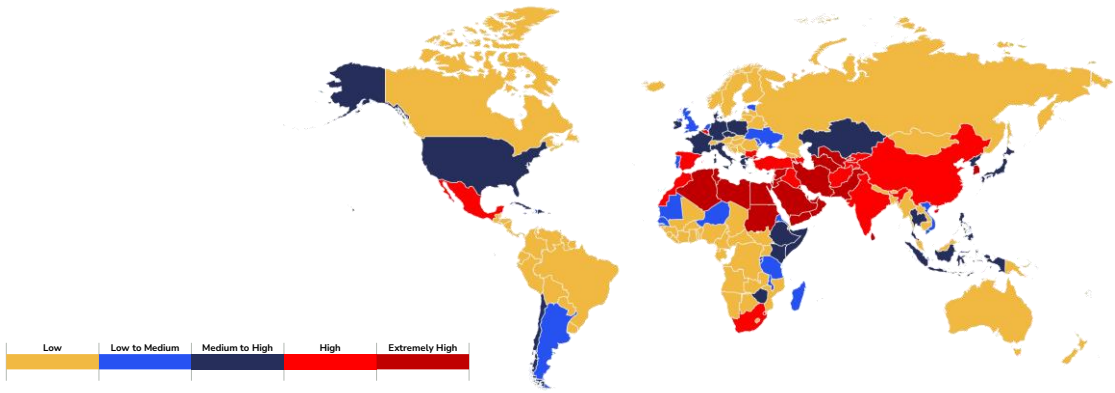
Water
Unlimited resource has its limits

Overview

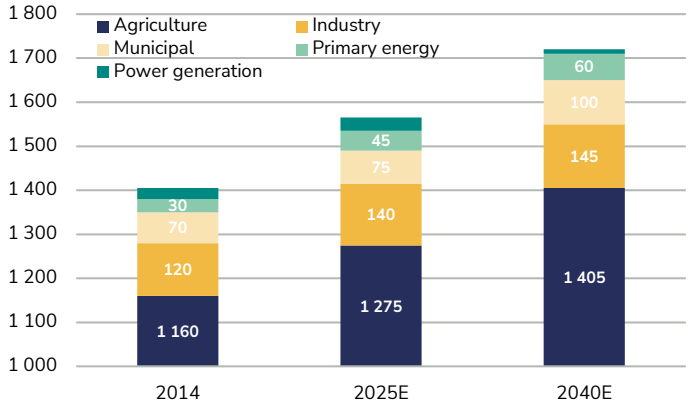
Approximately 70% of the surface of our planet is covered with water, but only 2.5—3% of that total amount is freshwater that we can drink. And an even smaller portion of it, less than 1%, is readily available (but not easily accessible), leaving more than 1 bn people without access to freshwater.

- Global demand for water is set to rise on average by 1% per annum until 2050, driven primarily by continued population growth and economic development. At this pace demand is expected to surpass natural supply by 40% by the end of the current decade (source: the UN).
- Agriculture remains the primary source of global water demand, accounting for up to 90% of total water use in certain regions (South Asia, Africa, and Latin America) and nearly 70% of global freshwater withdrawals. The remaining 30% is roughly equally split between industrial and domestic usage. Although the proportional rise is less than in other industries, agriculture will continue to be the biggest global user of water.
- The freshwater stress indicator is expected to peak by 2040. The latest (2021) UN estimates of the global freshwater stress indicator shows the ratio of water withdrawals to available water resources, is at the 18% mark and 10% of world population lives in high to critical water stress zones.
- **Prices.** The water crisis is a serious concern for developed economies as well. Half of the world's largest cities already experience water scarcity. For instance, the basic price of water and sewerage maintenance in the U.S. has increased nearly 50% in the last decade and grew 2.5x over the last 20 years, rising faster than inflation and food prices.
- **Markets.** Water purification and wastewater treatment are trending markets within the water industry. The purifier market, valued at around $40 bn in 2021 and has a consensus CAGR estimate within the 10—11% range until 2031. Wastewater is set to reach nearly $500 bn by 2029, growing at 7% p.a.

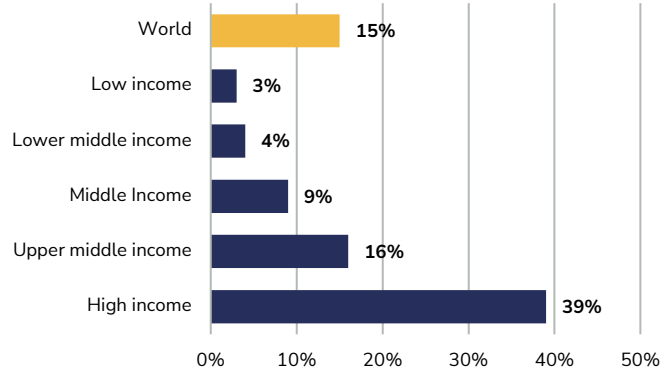
1. Freshwater stress map



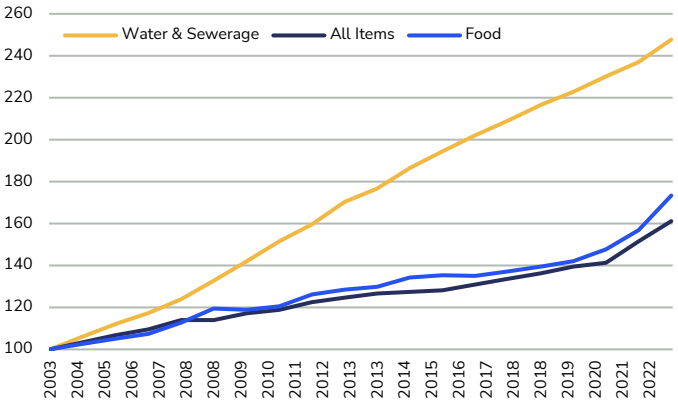
2. Projected water consumption to 2040, cbm



3. Industrial freshwater use 2020, % of total



4. US CPI water/sewer rates index



5. Global water & wastewater treatment, $ bn

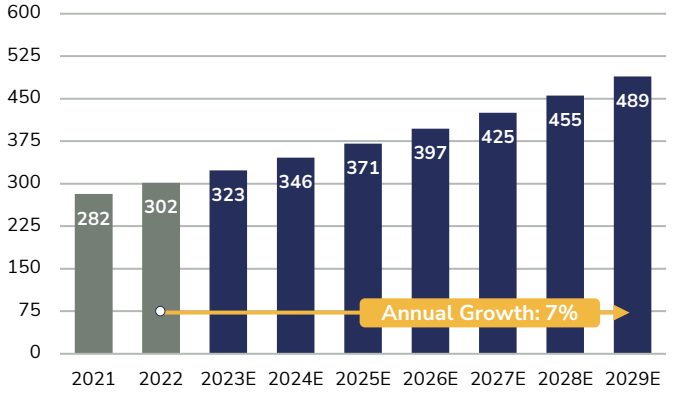


Chart sources: (1) FAO (2019). (2) Statista Research. (3) AQUASTAT. (4) US Bureau of Labor Statistics. (5) World Bank.

Agriculture. Market
Food is good

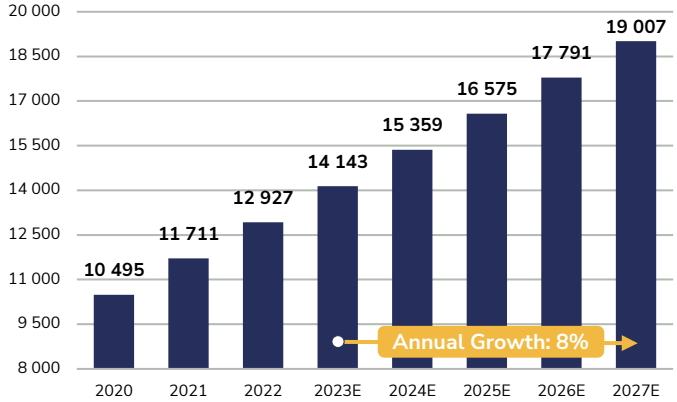
Overview

There is rising demand for sustainable agricultural production.

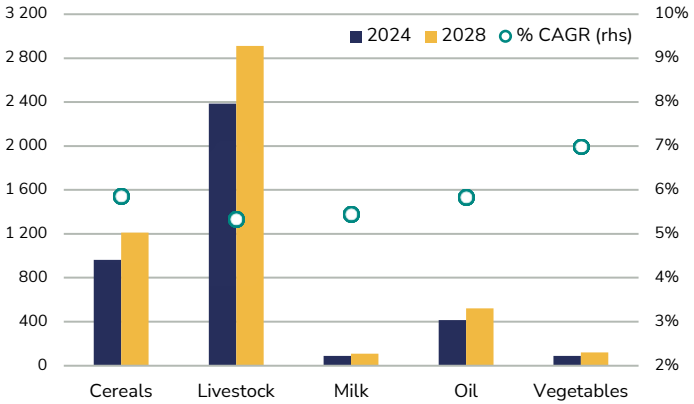
- The agriculture industry has radically transformed over the past 50 years. But now, in 2024, with the rise of AI, agriculture is in the early days of yet another revolution, at the heart of which lie data and connectivity. Artificial intelligence, analytics, connected sensors, and other emerging technologies could further increase yields, improve the efficiency of water and other inputs, and build sustainability and resilience across crop cultivation and animal husbandry.
- **The global agriculture market** is valued at $13.4 trln in 2023 and is expected to grow to $15 trln in 2024 at a CAGR of 9.1%
- **The global smart agriculture market** was valued at $13.7 bn in 2020 and is expected to reach $18.3 bn in 2024, growing at a CAGR of 8.1% until 2027.
- **The global agriculture robot market** is expected to reach $65.5 bn by 2030, registering a CAGR of over 24.3%. The global market volume of agricultural robots is expected to reach 36 mn by 2030, growing at a CAGR of 25%.
- Some of the key players in the agriculture robot market are Deere & Company, Trimble, AGCO Corporation, AgJunction, DJI Technology, Boumatic Robotics, Lely Holding, AG Leader Technology.
- Overall, **the global agriculture equipment market** is valued at $150.2 bn in 2022 and is expected to grow to $170 bn in 2024 with a CAGR of 6.5% and the following key application segments: land developing and seed bed preparation, sowing and planting, weed cultivation, plant protection, harvesting & threshing, post-harvest processing.
- **The global Agrobiology market** was valued at $11.2 bn in 2022 and is projected to grow to $15.2 bn in 2024, exhibiting a CAGR of 14.1%. The top 6 players accounted for about 60% of the global agrobiology market.
- Some of the key players in the Agrobiology market are BASF, Bayer, Syngenta AG, UPL, Marrone Bio Innovations, Isagro, Valagro, Koppert Biological Systems, Biostadt India Limited, and Lallemand.

Charts sources: (1) McKinsey & Company, (2) Gartner

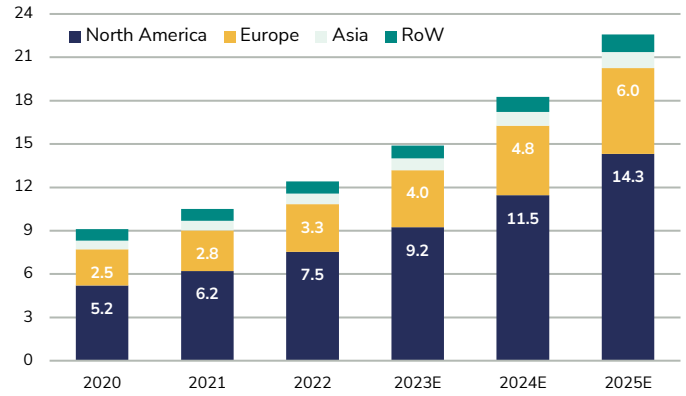
1. Global agriculture market size, $bn



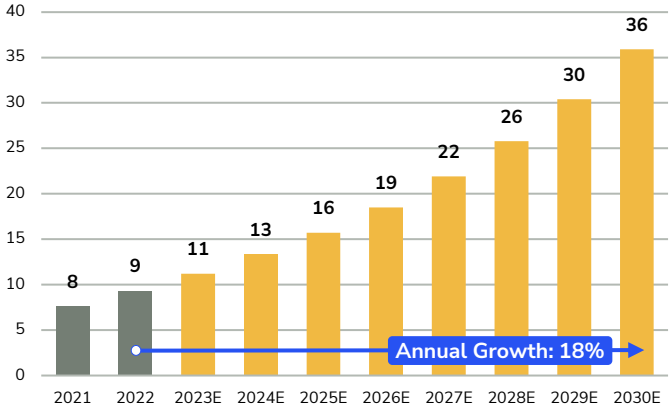
2. Agriculture gross production value, in $bn



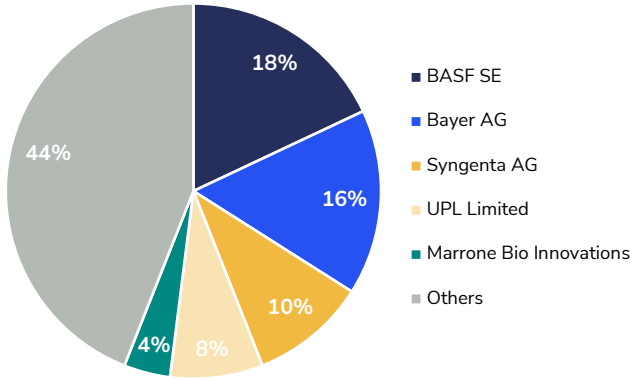
3. Agricultural technology market value, $bn



4. Market volume of agricultural robots, mn units



5. Top Agrobiology players by share, %



Opportunities for investors:

- **Cold-chain logistics:** the infrastructure and services to preserve the quality and safety of perishable products along the supply chain.
- **Aquaculture:** the cultivation of aquatic organisms such as fish, shellfish, algae, and plants for food.
- **Precision irrigation:** the application of water to crops according to their specific needs.
- **Biofuels:** the production of fuels from renewable biological sources such as crops or waste.
- **Agricultural biotechnology:** The application of genetic engineering or other techniques to modify plants or animals for improved traits or performance.

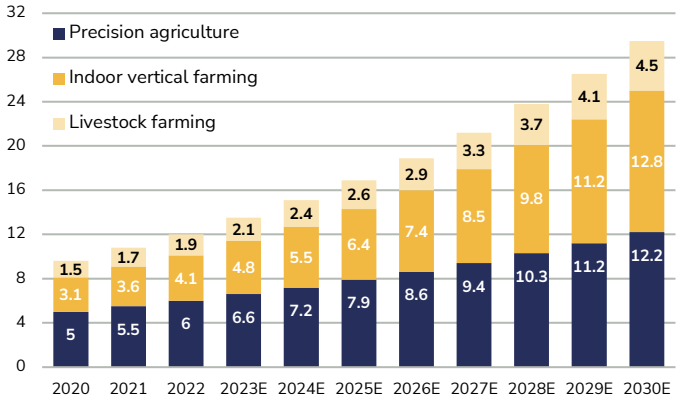
Agriculture. Innovative segments
Teaching old dog new tricks

Overview

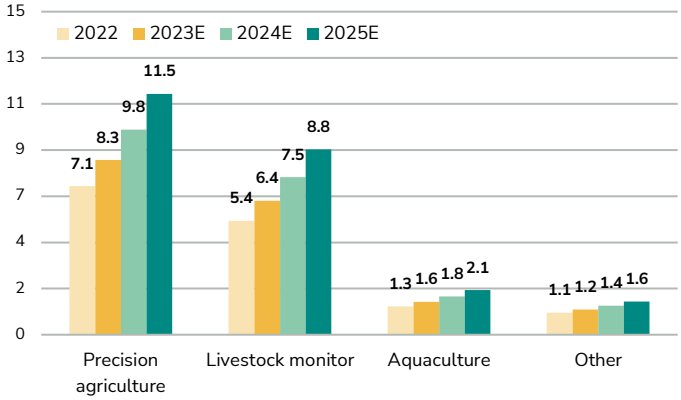
The 4th industrial revolution has reshaped the context of agricultural technology (AgriTech) with applications of artificial intelligence and a strong focus on data-driven analytical techniques. The following trends, in conjunction with thousands of years of experience, will enthrone agriculture in a new era for higher crop yields with fewer resources involved.

- **Precision agriculture.** Precision agriculture is the use of sensors, GPS, drones, robotics, artificial intelligence, big data analytics, and cloud computing to optimize crop management and farm operations.
- According to McKinsey & Company, the global market for precision agriculture technologies is expected to reach $7.2 bn in 2024, with a CAGR of 9.2%.
- **Indoor vertical farming.** Indoor vertical farming is the cultivation of crops in stacked layers under controlled environmental conditions using LED lighting, hydroponics, aeroponics, or aquaponics.
- According to Grand View Research, the global market for indoor vertical farming is expected to grow from $4.8 bn in 2023 to $5.5 bn in 2024, with a CAGR of 15.6% to 2030.
- **Livestock farming technology.** Livestock farming technology uses sensors, RFID tags, cameras, biometrics, wearable devices, and blockchain to monitor animal health, welfare, behavior, and traceability.
- According to McKinsey & Company, the global market for livestock farming technology is expected to grow from $2.08 bn in 2023 to $2.33 bn in 2024.
- **Agriculture technology-as-a-service (ATaaS)** is in its growth stage. Farmers are increasingly looking for more advanced and efficient solutions to manage their operations, resulting in an increase in demand for ATaaS. This has led to growth in the number of companies offering ATaaS solutions, as well as an increase in investment in the industry.
- The global agriculture technology-as-a-service (ATaaS) market is valued at $1.9 bn in 2023 and is expected to reach $2.2 bn in 2024, with a CAGR of 16.4% till 2030.

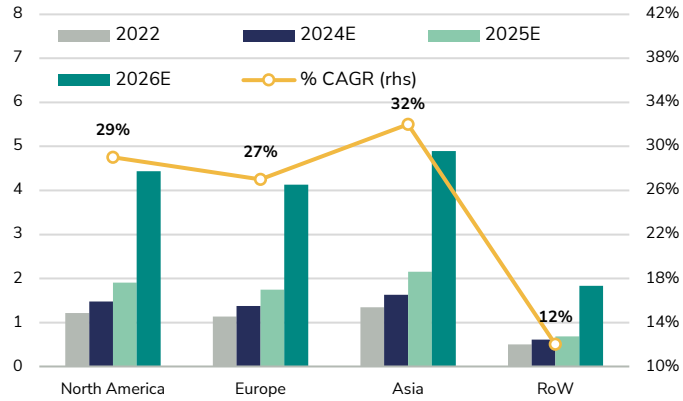
1. Industry trends by market size, $bn



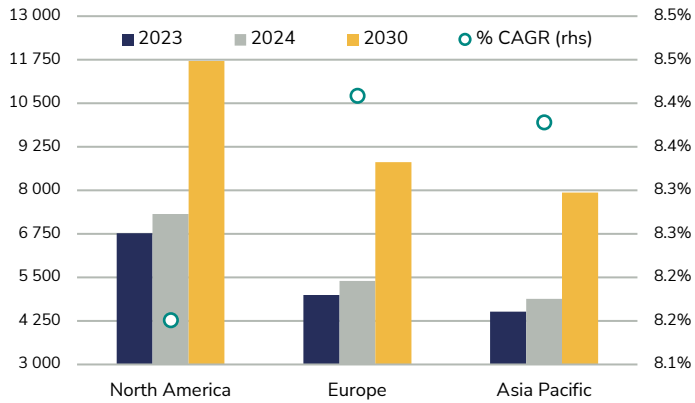
2. Global market value of smart farming, $bn



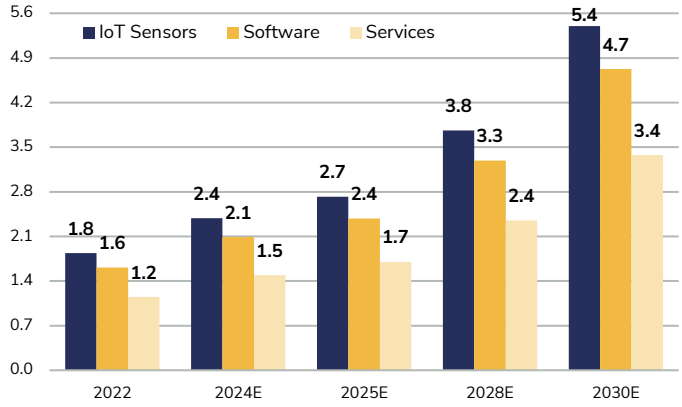
3. Vertical farming market value, $bn



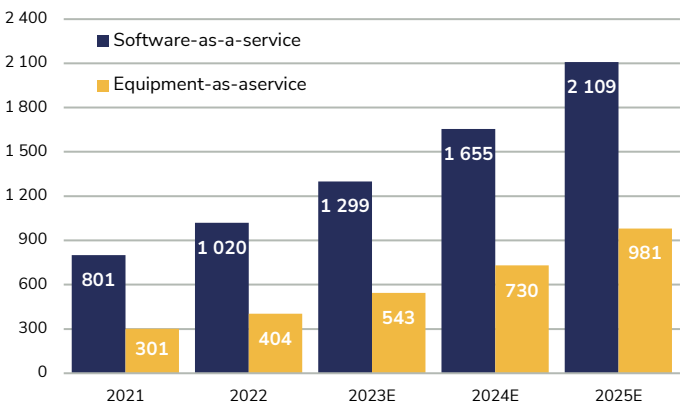
4. Precision agriculture market by region, $bn



5. Global Livestock farming technologies, $bn



6. Agriculture tech-as-a-service market, $mn



Charts sources: (1) BIS research

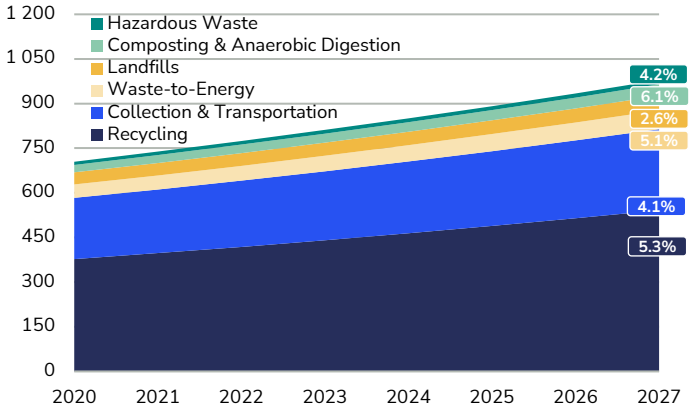
Waste
No time should be wasted

Overview

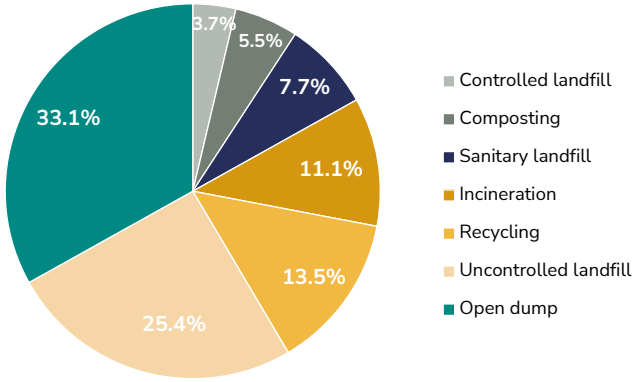
Each year we produce more than 2.2 bn tons of waste, improper disposal of which contributes to c.13% of worldwide greenhouse gas emissions, and still 3.5 bn people are lacking access to basic waste management.

- The World Bank estimates that global waste generation is expected to grow to 3.40 bn tons by 2050, which is more than double population growth over the same period. Its report on the state of waste management highlights that East Asia and Pacific regions generate the most waste, accounting for 23% of the global amount. It also projected a larger increase in daily per capita waste in high-income countries compared to low- and middle-income countries. And with 68% of the world population projected to live in urban areas by 2050, waste generation pace is set to accelerate.
- **Market.** Waste management is a $1.2 trln market today, projected to reach $1.8 trln in 2030 with an annual growth rate of 6.7%. Asia-Pacific leads the industry in market share with 55% and North America with another +25%, so these two regions account for more than 80% of the global market. Asian and US. companies are also leading the industry in terms of revenue generation. In the US market, the top 3 players are Waste Management (WM), Republic Services (RSG) and Waste Connections (WCN). Together they hold more than 36% of the market based on the companies' last-year revenues and the total US industry revenue of c.$100 bn.
- **Electronic waste.** One of the growing segments, as e-waste generation is set to exceed 74 mn tons, up 35% from 2020. Multiple reports suggest that in this period, the e-waste management market is expected to see a double-digit annual growth. Recycling is still underused, globally only 14% of all waste and just 10% of plastics are recycled. The global waste and recycling services market had a total size of $55 bn in 2020, last year it was valued at $60.4 bn, and by 2030 a much larger $88 bn.
- **Waste-to-Energy.** It might be another opportunity in waste management due to energy demands and the need for a circular economy. The market is expected to grow around 5% on an annual basis in the next 5—7 years.

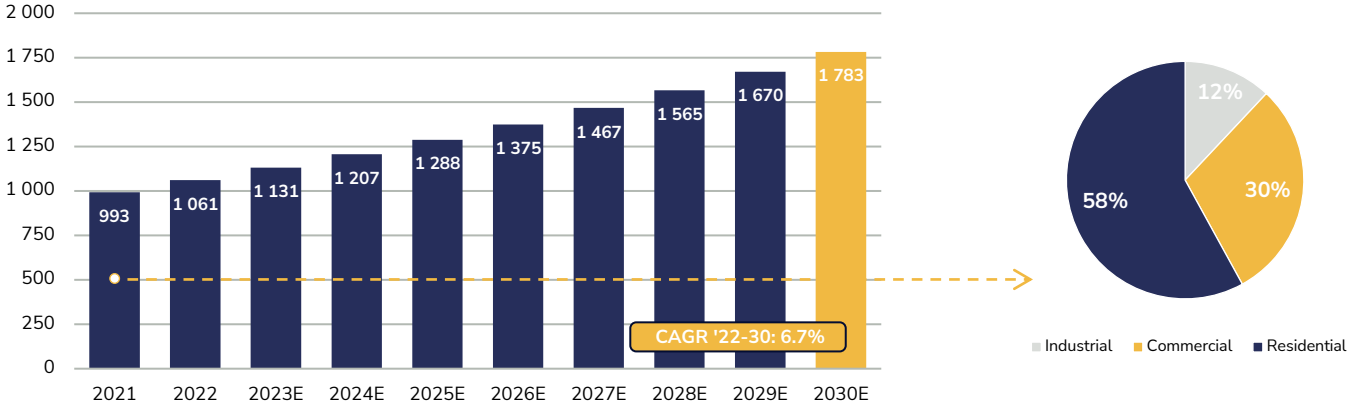
1. Projected waste generation by region, mn tons/year



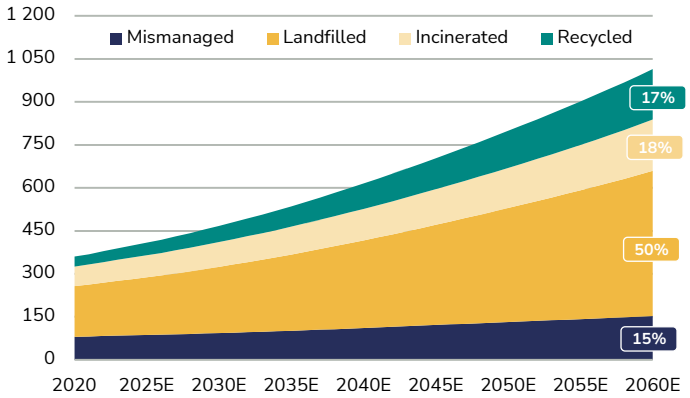
2. Global waste treatment, %



3. Global waste management market, $ trln



4. Global plastic waste, mn tons



5. e-Waste generation forecast, mn tons

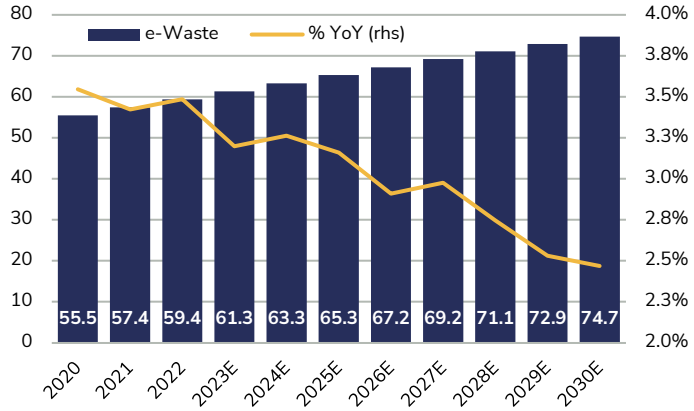


Chart sources: (1) World Bank (2018): What a Waste 2.0. (2) Precedence Research. (3) OECD Global Plastic Outlook. (2) UN World Urbanization Prospects.

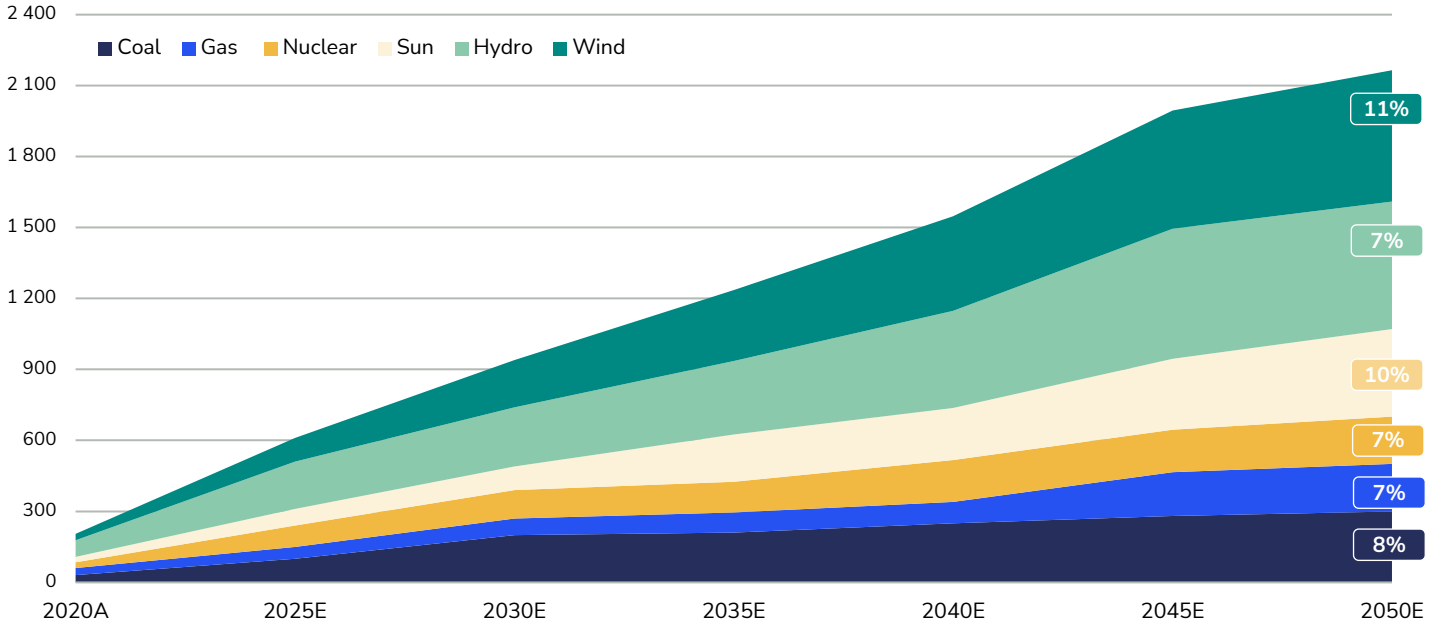
Clean energy. Trends Slowly, but surely

Overview

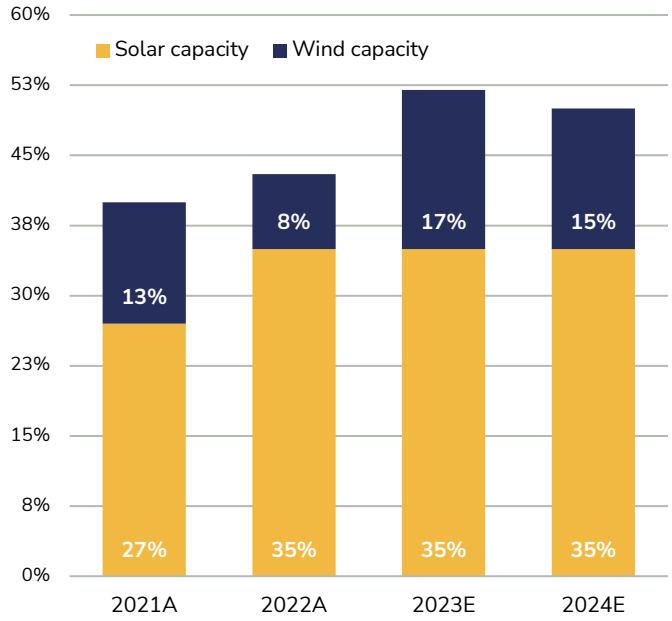
Rising geopolitical tensions and further moves toward "*green energy*" will accelerate growth in demand for renewables.

- Renewable energy companies seem to benefit from the current macroeconomic landscape due to growing demand and a highly accommodative regulatory framework[1].
- Global renewable capacity growth in 2023 is expected to be c.107 gigawatts (GW), the largest absolute increase ever, to more than 440 GW in 2023, driven by policy support, energy security concerns, and improving competitiveness against fossil fuel alternatives. Factors hindering growth include high interest rates and rising investment costs, exacerbated by by supply chain constraints.
- According to multiple sources, total renewable capacity growth could reach up to 550 GW in 2024, driven by the accelerating deployment of residential photovoltaic installations and rising interest in onshore wind energy solutions.
- **Solar photovoltaic capacity** is the major driver of this year's growth, providing approximately 2/3 of the annual growth. According to multiple sources, solar photovoltaic capacity will continue to grow in 2024. The IEA forecasts that cumulative solar PV capacity is expected to demonstrate growth of almost 1 500 GW over the next 5 years (its total capacity is expected to exceed natural gas by 2026 and coal by 2027).
- **Onshore wind** capacity growth is also expected to demonstrate ongoing momentum. Supply is expected to grow by 70% to 107 GW, an all-time record amount. Growth is significantly driven by the commissioning of delayed projects in China after the COVID-19 restrictions. The EU and US are also expected to demonstrate growing momentum after diminishing supply chain constraints.
- **Renewable energy storage.** The global move toward renewable energy has had a significant role in driving demand for long-duration energy storage (LDES). In 2023, technologies used in LDES will remain topical, and major LDES providers could benefit from rising demand.

1. Global EBITDA value pool by technology, $bn



2. US change in energy supply, % of total change



3. US renewables production, quadrillion, Btu

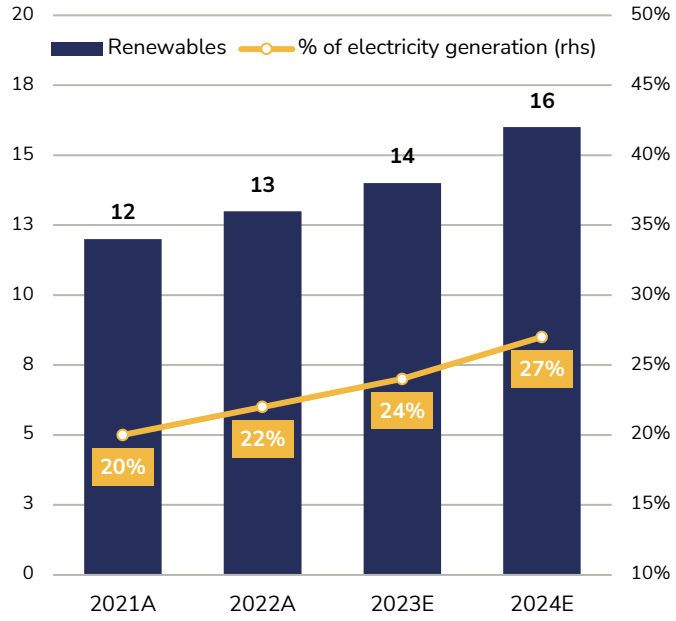


Chart sources: (1) Aurora Energy Research (2,3) EIA

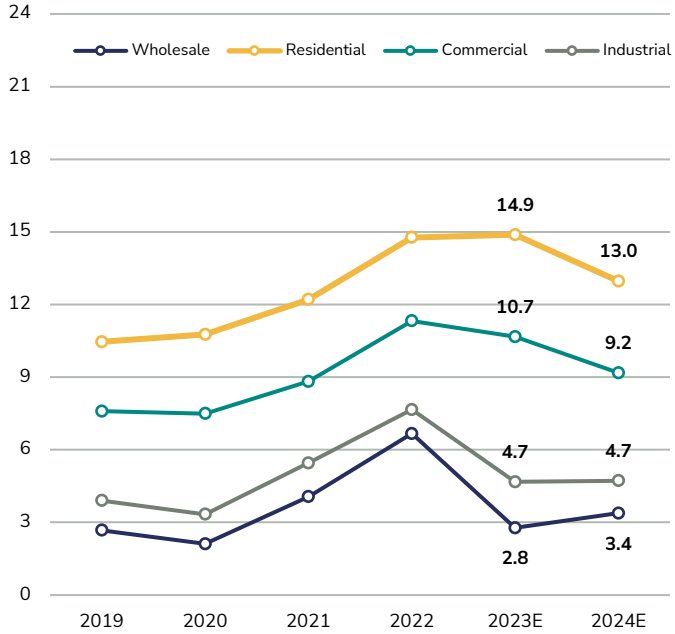
Clean energy. Natural gas
Blue energy

Overview

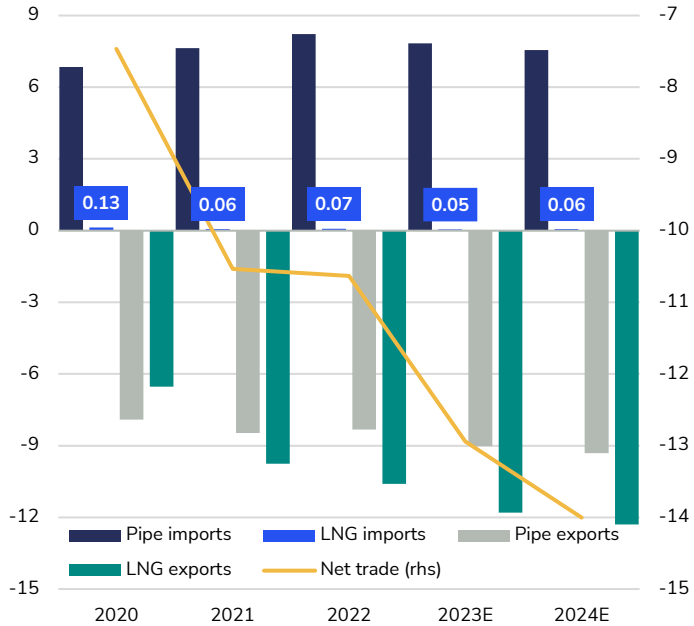
US forecast data show that in 2024, the residential price of natural gas will decrease by almost 20% YoY, reducing winter heating expenditures for consumers. European gas prices are set to fall 20% by mid-2024, compared to the current forward price curve, despite the market's recently tightening due to the extensions of gas field maintenance schedules in Norway and strikes at key Australian liquefied natural gas (LNG) fields.

- Driven by strong natural gas production and expected warmer-than-average winter weather, it is forecast that US natural gas inventories will end the winter heating season in March with 21% more natural gas than the five-year average.
- Also, EIA expects that US natural gas production will be an average of almost 115 bn cubic feet per day (bcf/d) during 2024. The warmer-than-average winter weather, with 4% fewer heating degree days (HDDs) this winter compared with the prior 10-year (2013—2022) average, reduces consumption for space heating in the commercial and residential sectors by 2% compared with the five-year average.
- Europe is expecting a reduction in overall gas demand in 2024 (c.2.2% YoY). Gas use is expected to decline by 12% YoY in 2024, a similar decline to that of 2023, caused by an increase in renewable capacity, improved nuclear performance, and still relatively weak electricity demand. The anticipated rebound in industrial and residential demand will also fail to fully materialize, given challenging economic factors.
- However, forecasts of an El Nino year suggest there is now a higher chance of a warmer-than-average winter 2023—2024 across Asia and Europe, which risks putting further downward pressure on prices.
- Overall, the market anticipates a big drop in world prices in 2025 on expectations that more LNG supply will be available. However, this might be overplayed, as it may take time for supply to ramp up, while LNG demand in Asia will definitely increase.

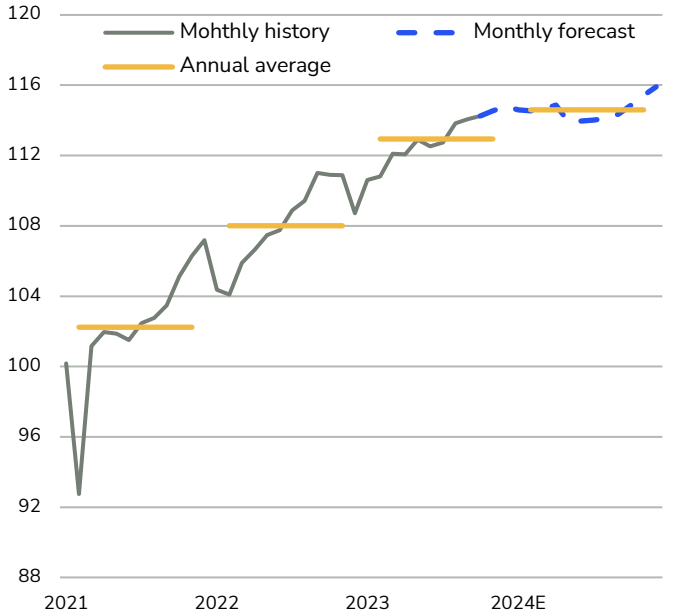
1. US natural gas prices, $/tcf



2. US annual natural gas trade, bcf/day



3. US marketed natural gas production, bcf/day



4. EU gas market balance across winter 2023-24

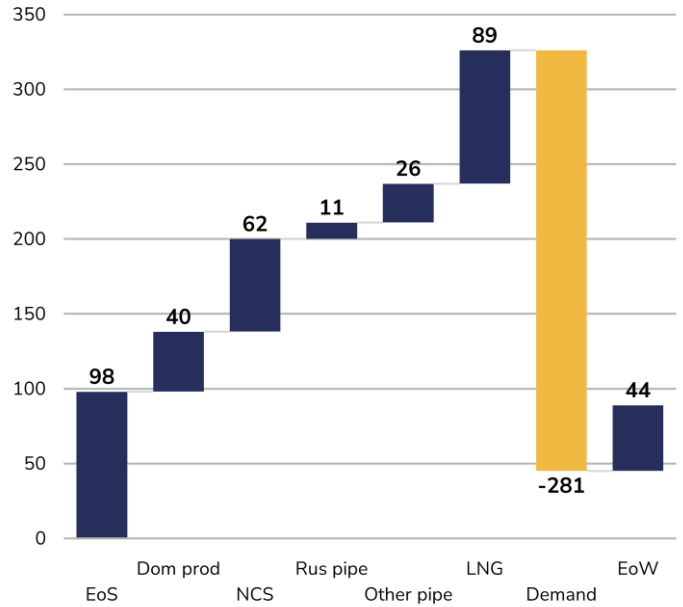


Chart sources: (1) EIA, World Bank, Bloomberg (2) Timera Energy, IEA, Eurostat, LNG Unlimited. Notes: Europe defined as EU 27 + UK + CH

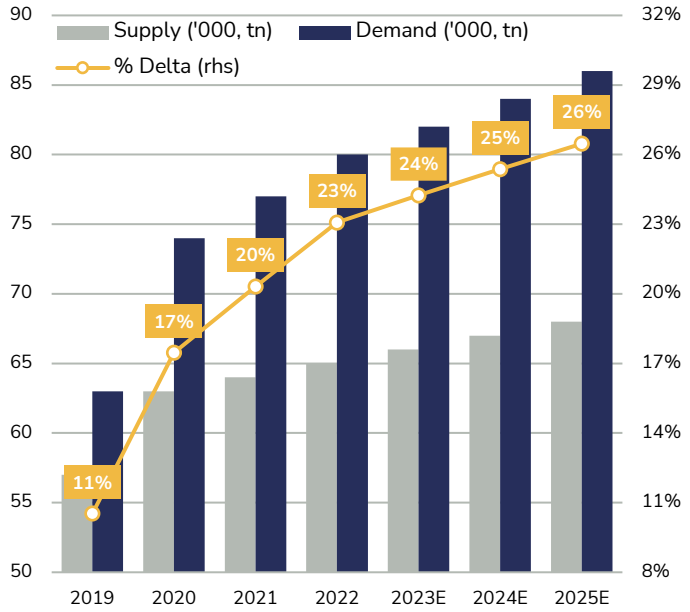
Clean energy. Nuclear
Critical step for energy transition

Overview

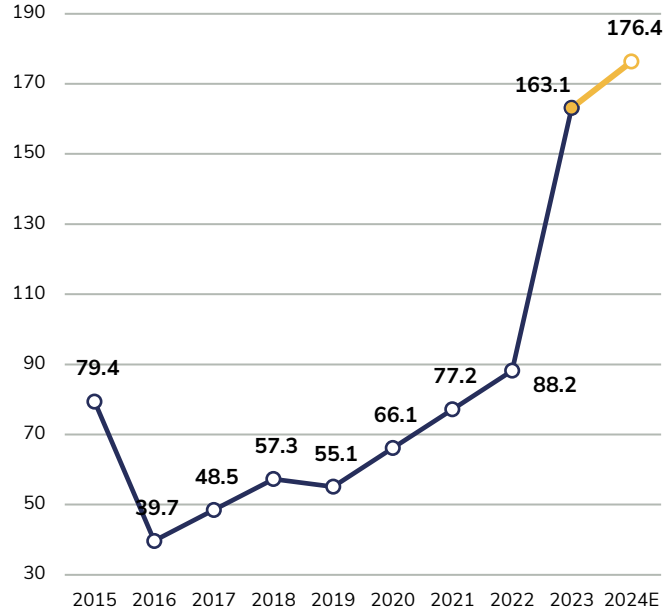
Renewables often suffer from intermittency and low capacity and require offsets with base-load energy sources, such as coal, natural gas, or nuclear power plants. As the world continues to add renewable capacity to grids, nuclear energy will have an important role to play, given that it can provide the greatest capacity.

- Nuclear power contributes approximately 10.4% of the world's total energy supply, with an even a higher share for the EU (25%) and the US (19%). Globally, 55 reactors are currently under construction, with an additional 54 reactors planned, this will increase the nuclear capacity by 30%. The Chinese government intends to invest $440 bn in nuclear reactors over the next 15 years.
- According to the World Nuclear Association, the global demand for uranium is expected to reach 84 000 tonnes in 2024 and 106 000 tonnes in 2035. The global supply of uranium is projected to reach 67 000 tonnes in 2024 and 81 000 tonnes in 2035.
- Uranium supply consists of new production and existing inventories, largely from decommissioned nuclear weapons stockpiles. Supply from mining production met approximately 67% of 2022 uranium demand, with the remainder being met with commercial stockpiles and nuclear weapons stockpiles. However, the depletion of these secondary supplies will result in a projected drop to 15 750 t (24% of U_3O_8 supply) by 2025 and to only 9% of the total supply in 2030. It is estimated that there will be a deficit of U_3O_8 of 25% in '24 and 27% in '25.
- According to the Nuclear Energy Institute, a wind facility would require more than 170 times the land needed for a nuclear reactor to generate the same amount of electricity. While nuclear requires 103 acres per million megawatt-hours, solar needs 3,200 acres, and wind uses up 17,800 acres. Also, nuclear technology has a very competitive levelized cost of energy (LCOE). The average cost per unit of energy generated across the lifetime of a new power plant.
- The uranium industry is expected to face a positive outlook in 2024—2025, as the demand for uranium grows due to the expansion of nuclear power and as the supply of uranium remains tight.

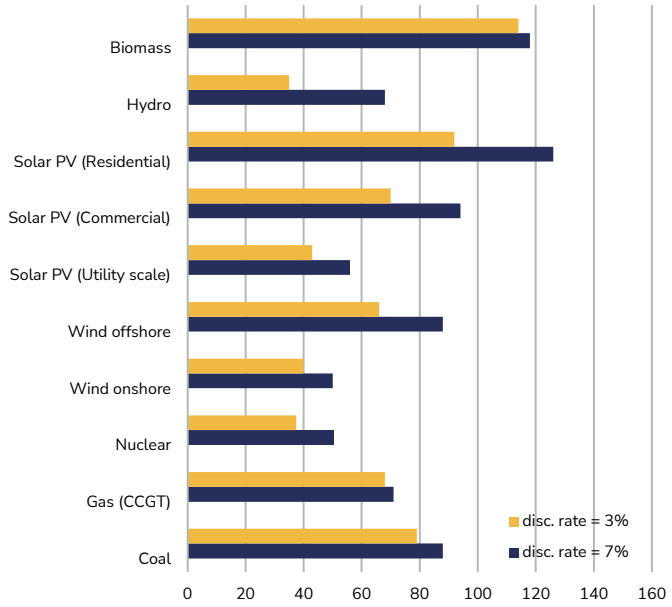
1. Global Uranium (U308) Supply/Demand



2. Annual Uranium (U308) spot price, USD/tonnes



3. Median LCOE by technology, $/MWh



4. Total Nuclear LCOE breakdown by segment, %

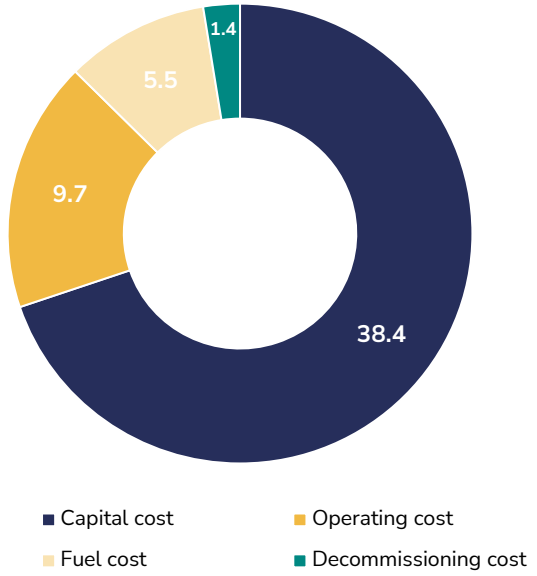


Chart sources: (1) World Nuclear Association. (2) GE Hitachi Nuclear Energy

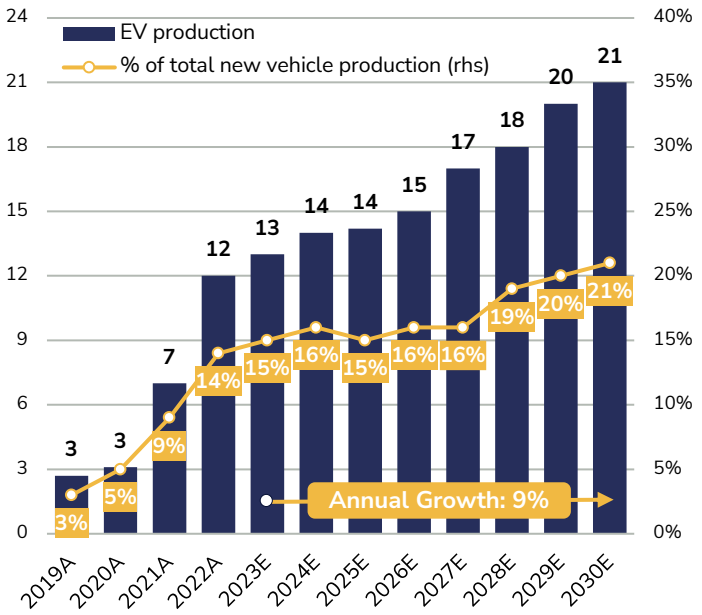
Mobility
Path to an energy-efficient business

Overview

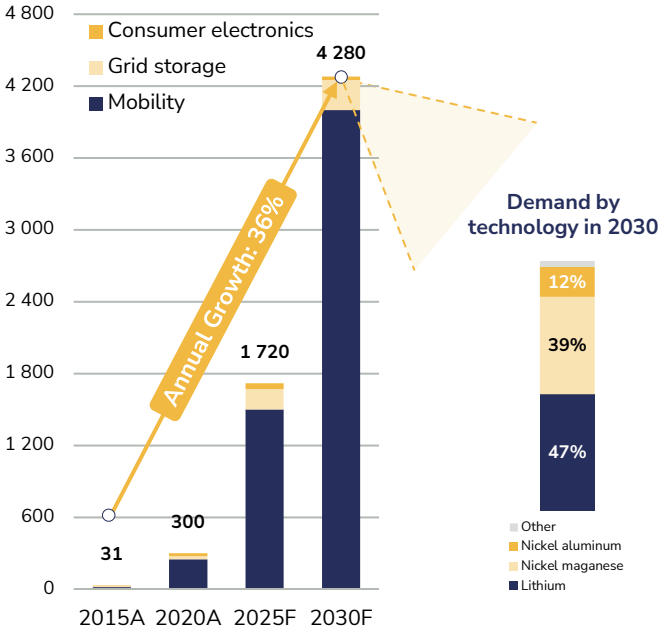
We focus on the areas that demonstrate a higher than average expected CAGR and a stable high return on invested capital.

- **Electric vehicles.** Within all the mobility market subsegments, EVs will demonstrate the most promising ratio of market growth to profitability, with a forecasted long-term CAGR of c.9% (**fig. 1**) and an ROIC of c.17%. EVs market share in total new vehicle sales is expected to increase from the current 14% to 20% by 2030.
- **EV batteries market.** Batteries currently remain the most expensive part in the process of EV production. Battery production costs rose 7% YoY in 2022 and are expected to demonstrate minor growth in 2023—2025. In nominal terms, the market is expected to demonstrate a CAGR of c.21% till 2030 (**fig. 2**).
- **Autonomous driving (AD).** Big Tech companies, as well as hardware providers and vehicle manufacturers, are heavily investing to enter the autonomous vehicles market. Despite relatively moderate ROIC (current c.9%), the market is expected to grow with a high CAGR of c.12% YoY (**fig. 3**). Components (+HW/SW) providers are to generate a more substantial return on invested capital (c.13% as of 2022).
- **Commercial airlines.** According to diverse sources, demand for commercial flights is expected to grow by 0.8—5.0% YoY by 2030 (**fig. 4**). Meanwhile, bottlenecks, due to the lack of professional pilots, current quarantine measures, and geopolitical tensions, remain and negatively impact operators' margins.
- **Railroad transportation.** Transportation by railroad is the most energy-efficient type. However, the massive lack of personnel also influenced a decrease in forecasted transportation volumes. In the long term, this segment of mobility will demonstrate a CAGR of c.4% YoY for the operators and c.1% for the rolling stock manufacturers.

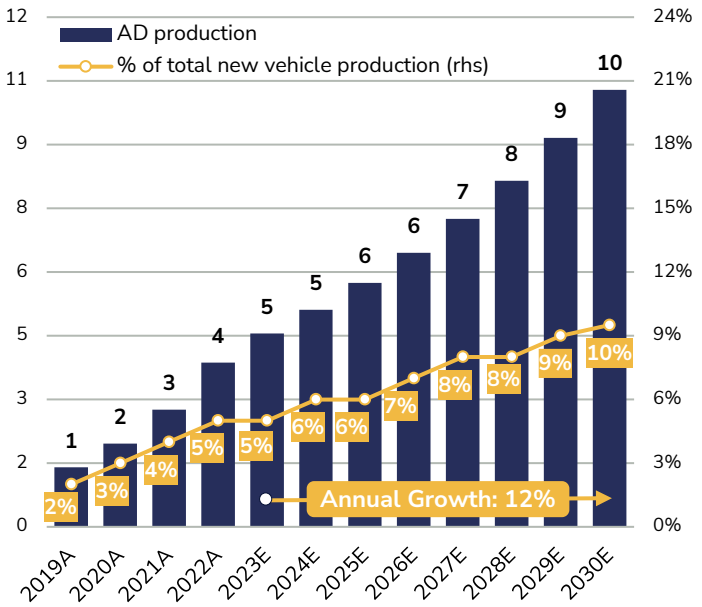
1. Global EV unit sales, mn units



2. Demand for lithium-ion batteries, GWh



3. Global AD unit sales, mn units



4. Global airlines revenues, $bn

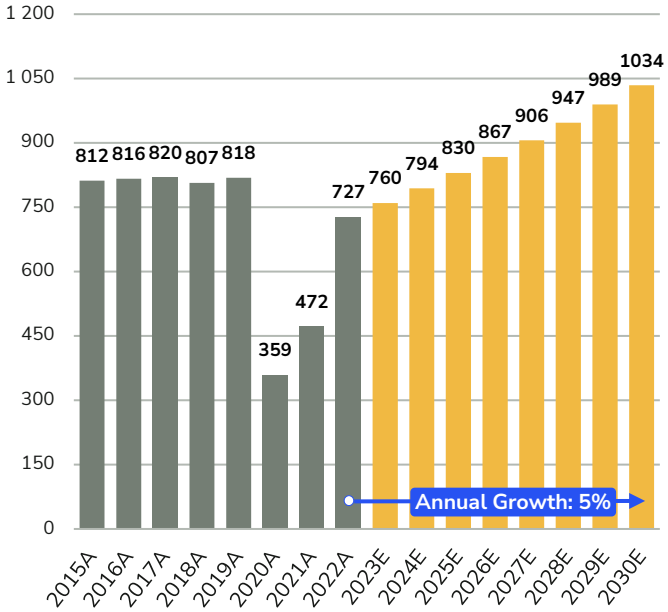


Chart sources: (1,2,3) One of Top-3 Strategy Consultants, AITA, US National Bureau of Statistics, Company reports

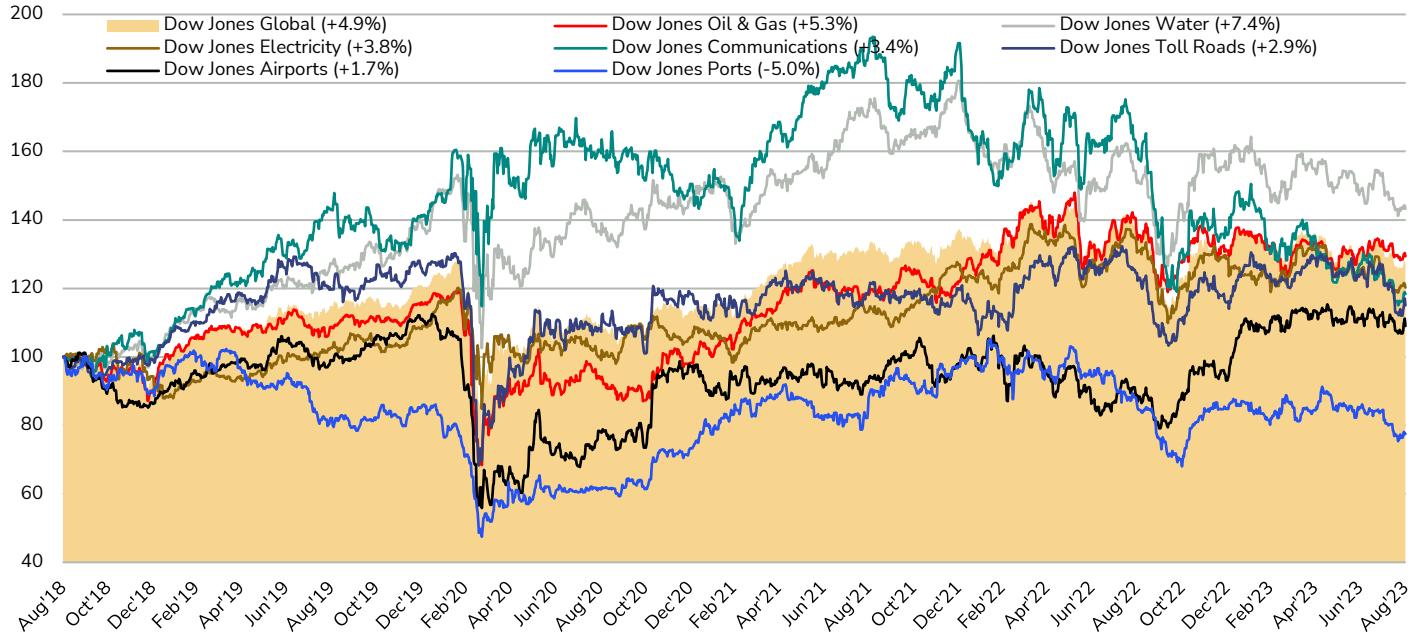
Infrastructure
A lot to be changed, even more to invest

Overview

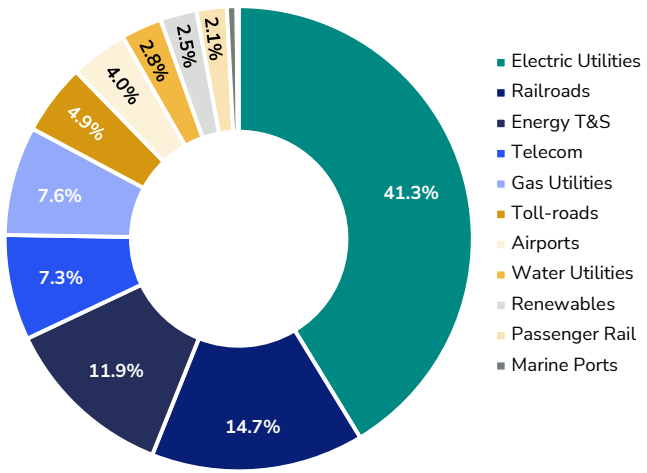
The projected cumulative infrastructure investment needed by 2040 to keep up with anticipated demand is estimated at $94 trln. Current trend dynamics suggest that there will be a $15 trln investment shortfall.

- There is a structural growth narrative across the infrastructure investment universe. Public policy support for infrastructure investment remains strong globally, particularly for the replacement of aged infrastructure assets and the buildout of renewables. Infrastructure assets are an attractive investment option for long-horizon portfolios due to their low correlation with other investment options and their consistent returns.
- **Airports.** Infrastructure is benefiting from a recovery in volumes as travelers steadily return to the air. Commercial air travel has witnessed significant growth over recent decades, with total passengers per year increasing from 1.46 bn in 1998 to over 4.1 bn in 2019. By 2037, it is expected that the number of individuals flying commercial aircraft globally will reach 8.2 bn, more than doubling the current numbers and requiring massive investment in the sector worldwide.
- **Wireless towers.** Global growth in the demand for wireless data continues at a seemingly insatiable pace. Contributing factors include increased smartphone usage, data-intensive applications that utilize live-streaming video, and the rise in mobile banking. The global 5G infrastructure market is forecast to expand annually at a growth rate of c.35% to reach almost $96 mn by 2030.
- **Renewable energy.** Limiting climate change, reducing carbon dioxide emissions, and improving energy efficiency are also creating significant investment opportunities. Bloomberg estimates $11.5 trln will be invested in new power generation from now through 2050, with a significant portion of that being directed at renewables.
- **Roads.** Toll roads might be the leading market due to the current underinvestment. For many toll roads, the high inflation of 2022 has turned into toll uplifts in the latest quarters, supporting healthy earnings growth. Overall, the global electronic toll collection market is expected to reach $18.5 bn in 2030 (CAGR 8.5%).

1. Dow Jones Brookfield Infrastructure equity indices (31.08.2018 = 100)



2. Global listed infrastructure by market cap



3. Forward EBITDA growth, % YoY

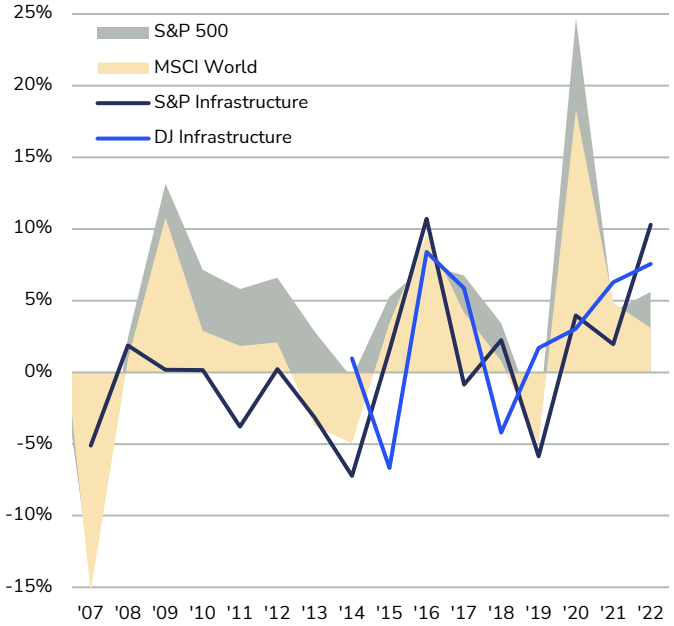


Chart sources: (1) US Census Bureau. (2) GLIO. (3) G20 Infrastructure Outlook.

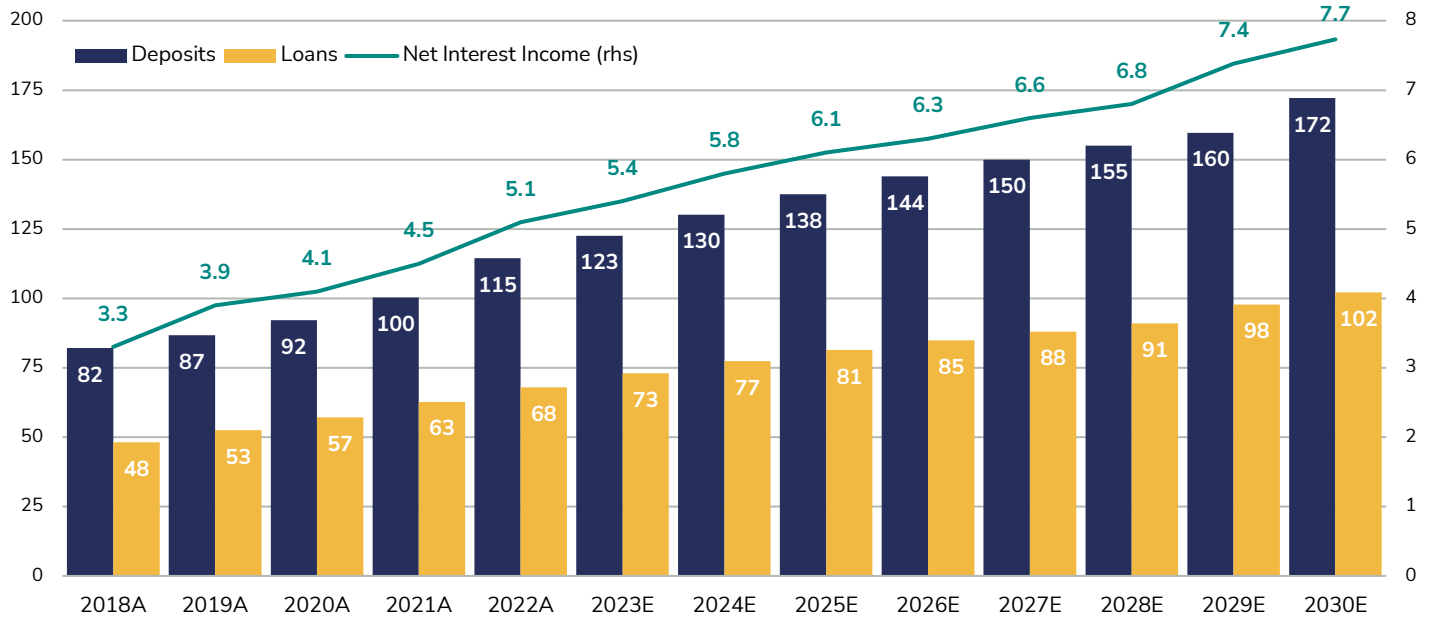
Financial edge
Towards more quality-controlled industry

Overview

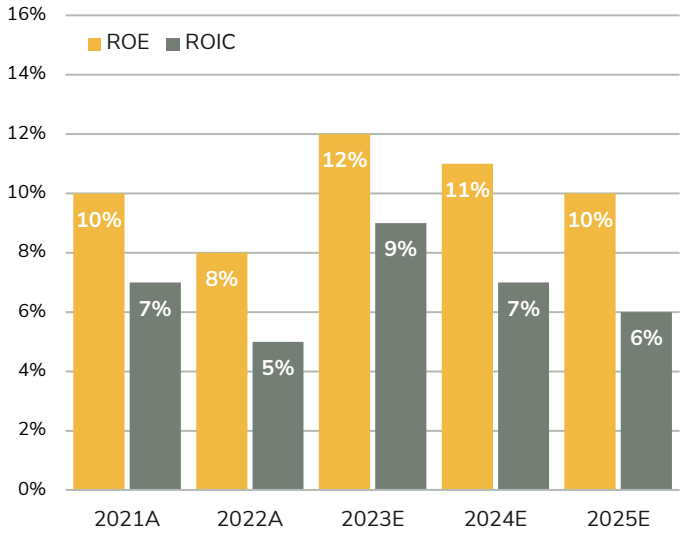
Focus on segments with strong pricing power and rapidly growing sales.

- **Banking sector: dealing with the aftermath of the 2023 crisis**. The 2023 banking crisis caused substantial regulatory and quality control shifts in US and EU banking systems (for example, the FDIC recommended raising the insured deposit limit for businesses and initiated special assessment fees to recoup losses from the sales of SVB and Signature). As a result, asset-quality deterioration and rising regulatory costs increased pressure on margins. Long-term banking market CAGR to be c.4.4% and ROICs to stabilize at low teens.
- **Financial conditions will remain tight, favoring banks with qualified liquidity management.** Changed wholesale bank borrowing conditions will continue to deteriorate as US deposit growth is expected to slow down, affected by slower economic growth and decelerating (in the longer term) deposit rates.
- **Basel IV will have a limited negative effect on banks performance.** Its implementation will impose additional requirements on banks: the minimum reserve capital a bank needs under the Basel framework is 10.5% of its risk-weighted assets, plus the countercyclical capital buffer and leverage ratio requirements.
- **Global ETF providers** could benefit from the prevailing market dynamics due to substantial part of recurring revenue and high pricing power.
- **Rating agencies** stand to benefit from a recovery in debt issuance and the remaining duopoly, both of which confer substantial pricing power. According to S&P Global, global bond issuance is set to increase by 1.7% in 2023. Despite the reduced pace of growth in new issuance, refinancing requirements remain a strong tailwind for the sector.
- **Payments:** The global payments market is expected to register a CAGR of over 8% by 2030, stably recovering after the pandemic. Network providers are best positioned for long-term growth in the payments market due to their global presence, strong pricing power and exposure to the ongoing recovery in cross-border travel.

1. Banking market segments forecast, $trln



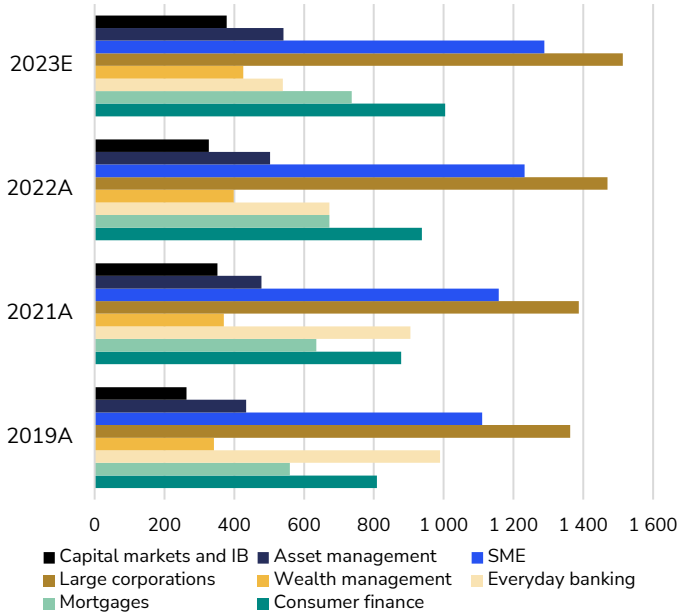
2. US banks average ROE / ROIC, %



Composition of major growth factors

Volume Impact	40%
Margin Impact	60%

3. Banking revenue per segment, $bn



Notes: (1) Gartner, McKinsey (2) AWS, Rackspace , Citi Bank

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