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The race takes off in the next big arenas of competition

In the arenas, investment cycles are accelerating, value pools are shifting, and a new type of competitor is scaling across industries.

Authors
Kevin Russell
Chris Bradley
Naveen Sastry
Suhayl Chettih
Kweilin Ellingrud
Natalya Goryunova

Editor
Cintra Scott

Design
Laura M. Mandujano

March 2026

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At a glance

— **The McKinsey Global Institute previously identified 18 future arenas of competition—from AI services to space—that are increasingly writing the global growth story.** Indeed, over the past three years, these 18 industries have grown roughly four times as fast as other industries in market cap and ten times as fast in revenue. Arenas are, by definition, the fastest-growing and most dynamic industries. As their scale and reach into the broader economy expand, it is fair to say that we are all in these arenas now.

— **Since 2022, an "AI foundation" set of industries—semiconductors, cloud services, and AI software—has added $500 billion in revenues and $11 trillion in market cap.** Infrastructure demand and investment have escalated rapidly in anticipation of AI deployment orders of magnitude larger than today. Companies that design and deploy computing power at scale have so far accrued most of the increase in market value and profit.

— **Meanwhile, growth continues to surge in digital industries, while many physical arenas are poised to take off.** Digital industries, such as e-commerce and digital advertising, are capturing a growing share of the attention economy, especially in emerging markets, even as chatbots reduce open-web traffic and agentic commerce creates new competitive fronts. Other arenas continue to escalate at varying paces, from robotaxis rolling out in dozens more cities worldwide to obesity drugs that are now six out of every 100 US prescriptions.

— **Nine large competitors—we coin them "omniscalers"—are spending heavily and spanning multiple arenas.** The nine omniscalers collectively generated over $700 billion in operating cash flow in 2025 and invested more than $800 billion in R&D and capital expenditures that same year. Their capabilities and financial capacity compound as they compete in arena after arena, expanding to generate revenues in as many as nine arenas.

— **Companies headquartered in the United States and the Greater China region account for 90 percent of arenas' market value today.** US companies lead in 14 of the 18 arenas in market cap and ten in revenues. But China is gaining ground, especially when measured by revenue shares. The rest of the world stands by—for now.


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Introduction

Entering 2026, record-breaking investment in semiconductors, cloud services, and AI software and services is poised to transform how global companies create value. This fast-growing "AI foundation" for business is accelerating the growth of digital ecosystems and enabling new physical-world applications, from space and robotics to drones and other forms of "physical AI" that sense, decide, and act in the real world. At the same time, novel weight-loss therapies are reshaping pharmaceutical pipelines, electrification is advancing steadily, and geopolitics is increasingly influencing how critical industries are built up and protected—particularly through technology sovereignty and supply chain resilience policies.

All this has rapidly evolved since McKinsey Global Institute published *The next big arenas of competition* in 2024. We defined arenas as those industries with the highest growth rates and the most competitive dynamism, where market-share changes are the norm. With this definition, 12 arenas were identified by analyzing market data from 2005 to 2020.[1] The original dozen included cloud services, e-commerce, biopharmaceuticals, and electric vehicles (EVs). Although these industries represented only about 10 percent of large-company revenues, they explained half the growth in market capitalization. They grew twice as fast as others, with roughly double the R&D intensity and triple the profitability.

Based on the markers of these 12 arenas over the last two decades, MGI identified 18 future arenas—industries showing early indications of the same potential to reshape the global economy over the next two decades. Some represent entirely new domains of competition, such as shared autonomous vehicles and space. Others, like semiconductors and e-commerce, reflect the ongoing evolution of earlier arenas as technology resets and investment cycles intensify. Throughout this report, we refer to all 18 as "future arenas," likely to lead in growth and dynamism to 2040, even as this group is changing the business landscape today.[2] Together, these 18 future arenas could generate $29 trillion to $48 trillion in revenues by 2040 (see sidebar "About the next big arenas of competition").

In this 2026 update, we focus on the 18 future arenas to explore how competition is unfolding within them. With this focus, we see accelerating investment, shifting value pools, and a new industrial landscape emerging. Looking back now, even with just a few more years' data, it seems our views were, if anything, conservative.

Chapter 1 presents evidence that the future arenas have far outgrown the rest of the economy since 2022 and are driving a disproportionate share of market value creation, which is why they are reshaping the technology frontier, capital flows, talent markets, and supply chains.[3]

Chapter 2 tells the story of recent dynamics across the arenas. To see the forest for the trees, we group them into five broad clusters with similar macro-level drivers: AI foundation, digitization, electrification, hard tech, and new bio-frontiers. Here we see the record-breaking surge in investment in AI and adjacent industries, the emergence of AI's physical constraints, and how digital businesses are being recharged with significant implications for further growth potential. The chapter continues with a look at some technological step changes in batteries, autonomous vehicles, obesity drugs, and other arena-shaping developments in the physical realms.

Chapter 3 explores how a small group of highly cash-generative companies are expanding across arenas through the compounding effects of financial resources, innovation capabilities, and bold execution. We call them "omniscalers" to draw attention to their arena-spanning scope, which positions them to reuse their capacity to scale. At the same time, focused champions continue to compete vigorously: Nvidia, the world's most valuable company at the time of writing, plays mainly in one arena—semiconductors.

Chapter 4 tracks the global race through a regional lens. US and Chinese companies figure most prominently, followed by players based in Europe and parts of advanced Asia. Differences in market structures shape these dynamics, alongside each region's existing strengths.

Chapter 5 concludes with a strategy perspective to help CEOs, senior executives, and policymakers act on early signs of industrial shifts that are most relevant to companies and economies. From both defensive and offensive perspectives, how can companies and countries best prepare for the next big arenas of competition?

Sidebar

About the next big arenas of competition

MGI published *The next big arenas of competition* in 2024 to answer two questions: Which industries are doing the most to reshape the world of business today? Which industries will do the most to reshape the world of business tomorrow?

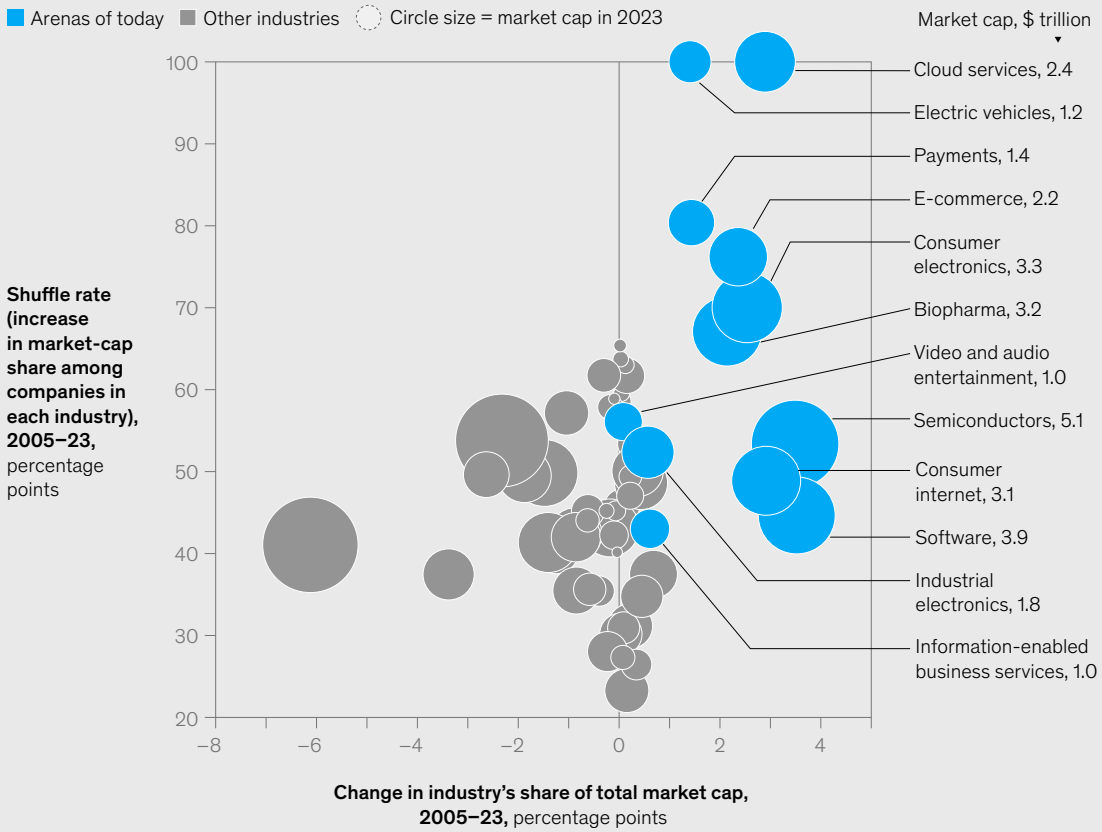
To tackle these questions, MGI used a longitudinal, company-level data set tracking 2,970 companies from 2005 to 2020 to analyze the industries marked by two characteristics: They capture an outsize share of the economy's growth, and market share within them changes hands to an outsize degree. The presence of these levels of growth and dynamism indicates that a new competitive game is underway, most often prompted by a new bundle of technologies and business models. These are what we call arenas. Over the last 20 years, 12 industries stood out on both growth and dynamism measured by shifting market shares across both revenue and market cap (Exhibit A).

Understanding arenas is important for a few reasons. For starters, they account for major shifts in investment, R&D, and value, as well as the emergence of many new and growing global corporations. Furthermore, once we started to recognize the factors that point to the potential formation of an arena, we could identify a set of future arenas. To do this future scouting, we scan for technology and business-model step changes that coincide with escalatory investment races. These conditions must also come with an addressable market that enables global scale—one that is large, growing, or both.

Exhibit A

The 12 past arenas exhibited outsize shuffle rates and growth shares.

Market-cap shuffle rates and growth share for 57 industries



Note: This exhibit was first published in *Capturing the next big arenas of competition in ten charts*, McKinsey Global Institute, Nov 2025.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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Sidebar (continued)

About the next big arenas of competition

Applying this framework looking forward, MGI identified 18 potential arenas of the future that could significantly increase their share of global GDP and generate an estimated $2 trillion to $6 trillion in profits in our scenarios for 2040 (Exhibit B). This report focuses on the 18 future arenas, not to resize our original 2040 scenarios, but to see what is happening on the way.

Exhibit B

The 18 future arenas could generate $29 trillion to $48 trillion in revenues by 2040.

18 future arenas, by 2040 revenue estimate, $ billion	**Revenue, 2022**	**2040 estimate** (CAGR, 2022–40, %)
E-commerce	4,000	14,000–20,000 (7–9)
AI software and services	85	1,500–4,600 (17–25)
Cloud services	220	1,600–3,400 (12–17)
Electric vehicles	450	2,500–3,200 (10–12)
Digital advertising	520	2,100–2,900 (8–10)
Semiconductors	630	1,700–2,400 (6–8)
Shared autonomous vehicles	n/a	610–2,300
Space	300	960–1,600 (7–10)
Cybersecurity	160	590–1,200 (8–12)
Batteries	98	810–1,100 (12–14)
Modular construction	180	540–1,100 (6–10)
Streaming video	160	510–1,000 (6–11)
Video games	230	550–910 (5–8)
Robotics	21	190–910 (13–23)
Non-medical biotech	140	340–900 (5–11)
Future air mobility	n/a	75–340
Obesity drugs	24	120–280 (9–15)
Nuclear fission	18	65–150 (7–13)
Total	**7,250**	**29,000–48,000 (8–11)**

Source: Company annual reports; McKinsey Value Intelligence; McKinsey Global Institute analysis

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Executive summary

Arenas are where to find the most growth and competitive dynamism. Going into 2026, we find an AI foundation is poised to enable new business models and technology resets in many future-facing industries—from digital platforms to physical realms, including robotics and space. Electrification is advancing steadily, new bio-frontiers are refreshing product pipelines, and geopolitics is shaping where and how critical industries are developed and protected.

A lot has happened since McKinsey Global Institute published *The next big arenas of competition* in 2024. In that research, we defined arenas as those industries with the highest growth rates and the most competitive dynamism, where market-share changes are the norm. With this definition, 12 arenas were identified by analyzing market data from 2005 to 2020.[4] The original dozen included cloud services, e-commerce, biopharmaceuticals, and electric vehicles (EVs). Arena industries grew twice as fast as other industries, with roughly double the R&D intensity and triple the profitability.

Similar features characterize the 18 industries that look most likely to evolve into the next big arenas of competition over the coming years. These future arenas, as we call them, include AI software and services, cybersecurity, shared autonomous vehicles, and modular construction. If the past is any guide, these 18 arenas will be tomorrow's centers of competition, innovation, and value creation. And since 2022, the 18 have already grown dramatically faster than the rest of the economy. Together, they have added roughly $18 trillion in market capitalization and $1.4 trillion in revenues in just three years.

Future arenas are not only expanding at disproportionate speed; they are reshaping capital flows, industrial dynamics, regional competition, and the strategic calculus of companies and governments alike.

Growth takes off in the future arenas

Since 2022, future arenas have pulled away from the pack. With a 29 percent CAGR from 2022 to 2025, their combined market cap grew nearly four times as fast as non-arenas. Revenues over the same period tell a similar story in even starker relief. Future arenas' revenues rose 11 percent per year, while non-arenas were essentially flat on aggregate. Over the same three-year period, capital expenditures and R&D for arenas also surged ahead, with a 14 percent CAGR, compared with just 4 percent for other industries (Exhibit E1). As a result of this momentum, future arenas have driven about half of total market-cap growth and revenue growth over the past few years. They are at the center of the global growth story now.

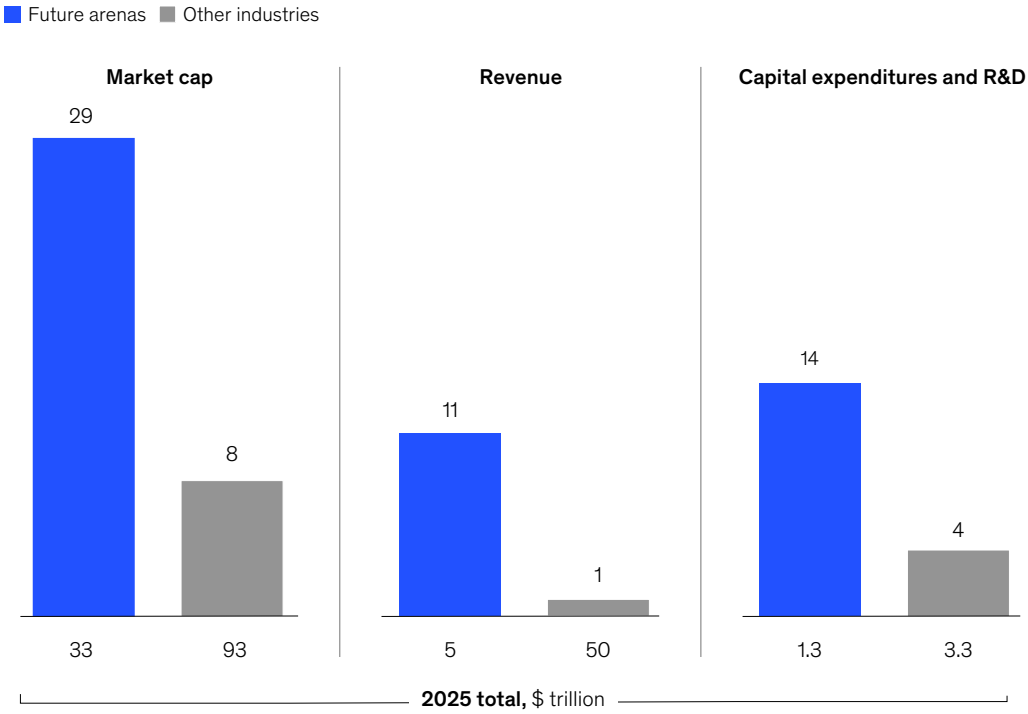
Beyond growth, rapid market-share shifts—that is, high levels of dynamism—are defining features of arenas. After just three years, from 2022 to 2025, early signals point to more fluid competition in these industries. The constant leapfrogging of frontier AI models is an example of this competitive dynamism at work.

At the same time, we continue to see three key ingredients forming a repeatable "arena creation potion." They are: a technology or business-model step change; an escalatory investment pattern; and a large or expanding addressable market. The potion recipe still appears to fuel arenas' strong growth and high dynamism. Looking for the three ingredients is a way to identify future high-growth arenas likely to propel global GDP in the decades ahead.

Exhibit E1

Future arenas are at the center of global growth.

Performance of future arenas and other industries, CAGR, 2022–25, %[1]



Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
[1]Analysis is based on a sample of 3,770 large companies globally. It covers 69 industries, including 18 future arena industries. The 2022 baseline aligns with the cutoff from *The next big arenas of competition*, McKinsey Global Institute, Oct 2024. Market-cap data covers 2022 (average of start and end of 2022) through 2025. Excluding companies with no data for capital expenditures and R&D available for 2025, but existing for 2024 (excludes 530 companies).
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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The 18 future arenas are pushing forward, some at warp speed

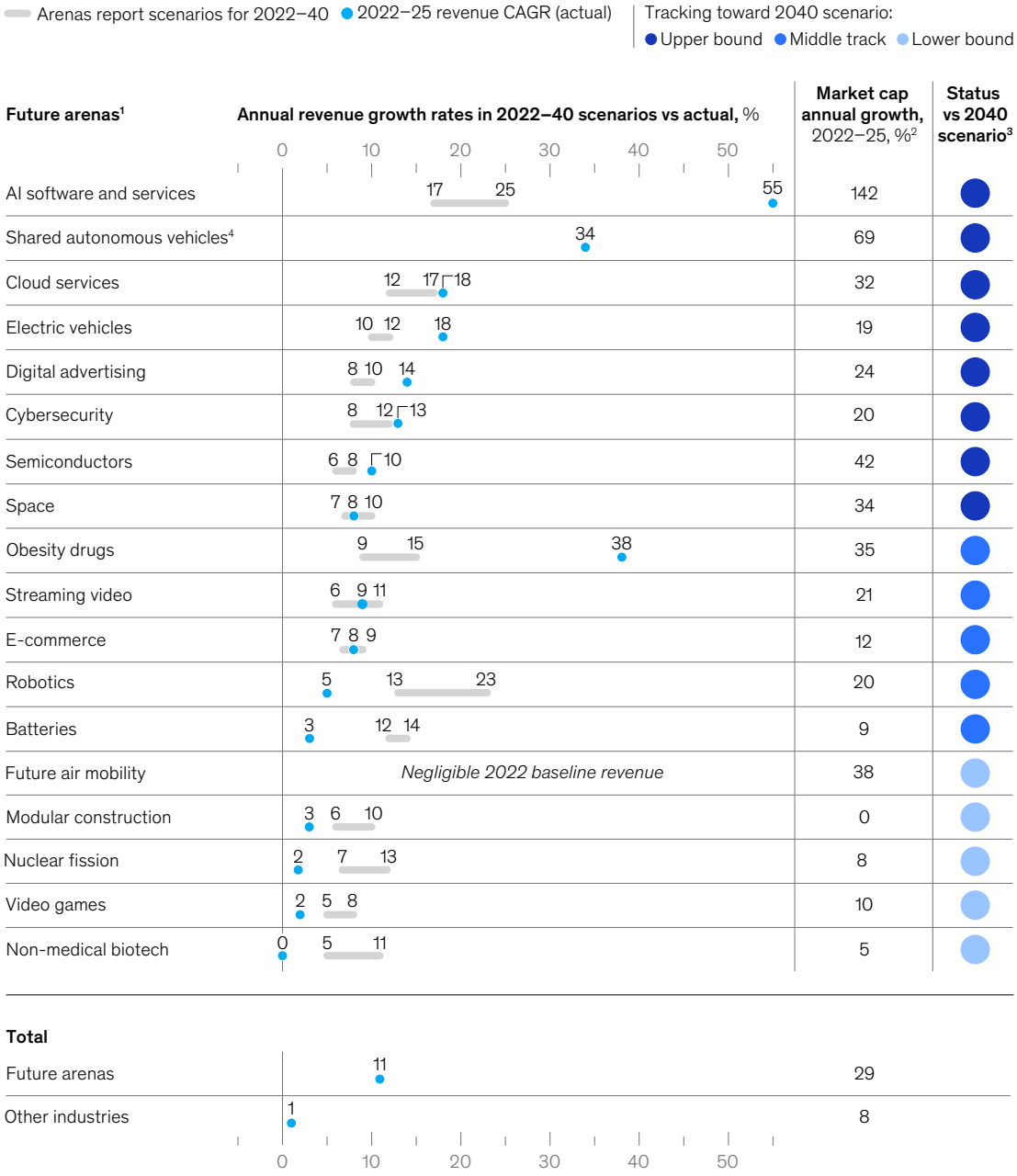
The future arenas are largely tracking within the growth boundaries our research modeled for 2040, with some growing notably faster.[5] In fact, eight arenas are racing ahead near the upper bound of the trajectory. That group features AI software and services, shared autonomous vehicles, cloud services, EVs, digital advertising, cybersecurity, semiconductors, and space. The other ten—including streaming video and future air mobility—are advancing roughly as expected or are in earlier stages of growth (Exhibit E2).

To make broader patterns easier to spot across the 18 future arenas, we group them into five themes: AI foundation, digitization, electrification, hard tech, and new bio-frontiers (Exhibit E3). Tracking by theme, we see an AI wave rising atop a still surging digital wave. At the same time, electrification is scaling and hard tech is poised to take off. Along new bio-frontiers, non-medical biotech remains nascent, while obesity drugs ramp up.

Exhibit E2

Most arenas have grown within or above 2040 scenario trajectories.

Arena revenue growth scenarios with 2026 status



Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
[1]Arenas are in descending order by status vs 2040 and revenue CAGR.
[2]Market-cap data covers 2022–25 (with 2021–22 used as the baseline average).
[3]Growth, dynamism, and the three arena-creation conditions are assessed to determine how a future arena is tracking. See the compendium for more details.
[4]Revenue CAGR measured vs 2023 due to negligible 2022 baseline revenue.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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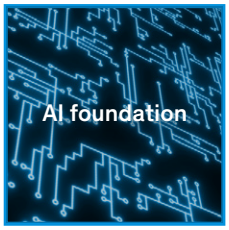
Exhibit E3

Future arenas added about $18 trillion in market cap in three years.

Incremental revenue and market cap between 2022 and 2025, $ billion[1]

Theme	*Total by theme* Revenue increase	*Total by theme* Market-cap increase	Market-cap increase by arena	
 AI foundation	490	10,770	Semiconductors	7,388
			Cloud services	1,831
			AI software and services	1,554
 Digitization	680	4,900	Digital advertising	3,070
			E-commerce	773
			Streaming video	407
			Cybersecurity	363
			Video games	284
 Electrification	190	930	Electric vehicles	786
			Batteries	104
			Nuclear fission	38
 Hard tech	30	560	Space	395
			Robotics	101
			Shared autonomous vehicles	51
			Future air mobility	15
			Modular construction	0.3
 New bio-frontiers	50	630	Obesity drugs	614
			Non-medical biotech	14
TOTAL, $ billion	1,430	17,790		

Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
[1]Market-cap data covers 2022–25 (with 2021–22 used as the baseline average). For private companies without a market cap, company valuations are used interchangeably. Figures may not sum due to rounding.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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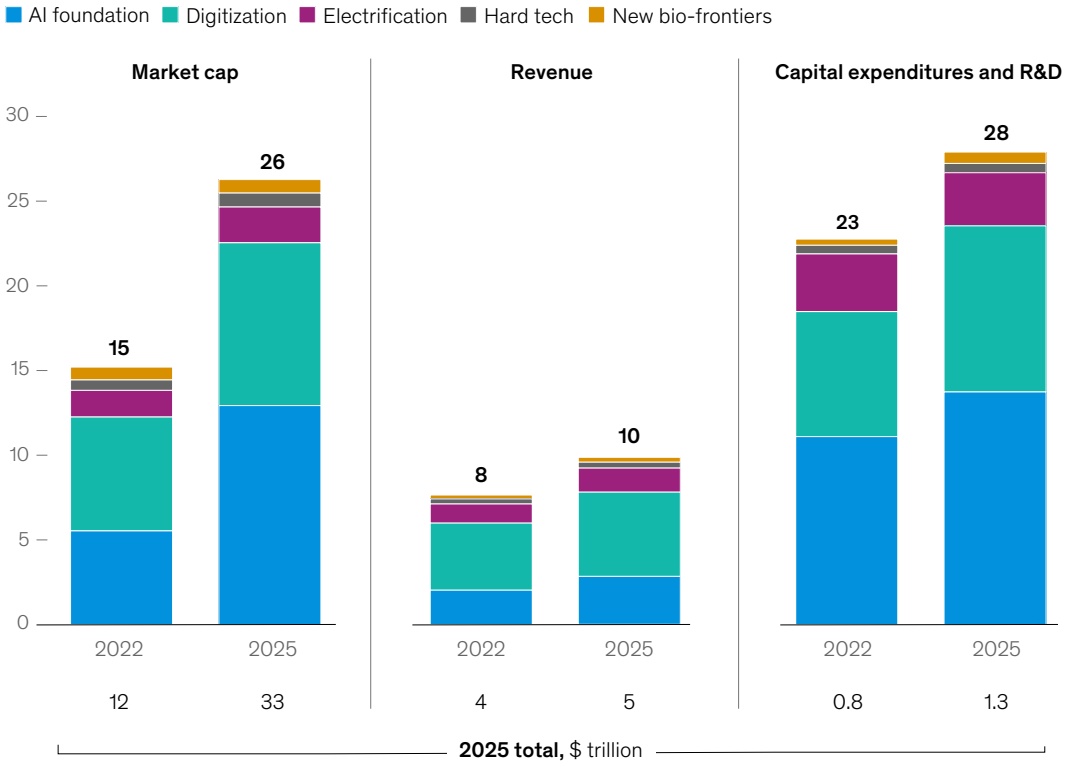
Of the five themes, the AI foundation is the fastest-growing across market value, revenue, and investment (Exhibit E4). Market value growth stands out, reflecting investors' expectations. Whether investor expectations for AI's future will be supported by companies' sustained returns on invested capital above the cost of capital is one of the biggest open questions in business today.

Exhibit E4

AI foundation has driven the most growth since 2022.

Arenas share by theme, 2022–25, % of database[1]



[1]Themes include the following industries: AI foundation (semiconductors, cloud services, and AI software and services), digitization (e-commerce, digital advertising, video games, streaming video, and cybersecurity), electrification (nuclear fission, EVs, and batteries), new bio-frontiers (non-medical biotech and obesity drugs), and hard tech (robotics, shared autonomous vehicles, future air mobility, space, and modular construction). In 2022, market cap declines were observed in select sectors including information technology, communication services, and e-commerce.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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Omniscalers are escalating competition across arenas

As we observe the rapid escalation of investments and competition in future arenas, a natural next question is *who* is driving it. Certainly, the world's leading cloud service providers, known as hyperscalers, are in the mix. Related players—we call them "omniscalers"—provide some broader answers to this question.

Omniscalers span arenas, playing simultaneously in many at once. Two quintessential omniscalers are the Amazon and Tesla-plus-SpaceX clusters. Together, they span e-commerce, EVs, AI, digital media, robotics, and space—moving swiftly from one arena to another as they compete with new entrants and each other. To pick out more omniscalers with comparable qualities, we researched the biggest investors in capital expenditure and R&D globally and then looked for the ones that are actively competing in three or more future arenas.[6] That definition added seven names to our list: Alibaba, Alphabet, Apple, Huawei, Meta, Microsoft, and Samsung.[7] Six of them are based in the United States, and the other three in Asia (Exhibit E5).

Why do omniscalers matter? Their growing presence in the arenas marks the emergence of new economies of scope and scale. For starters, omniscalers are deploying ever larger pools of cash into long-payback bets. Omniscalers' advantages also appear to lie in reinforcing bundles of assets and capabilities. No single element determines cross-arena success; we see a combination of reusable infrastructure, data network effects, high risk appetites, and top talent attraction among their interlocking strengths.

Some of their long-payback bets are already generating revenue. Omniscalers' revenue is an order of magnitude larger than that of other arena companies. By 2025, omniscalers averaged about $200 billion in revenue each in future arenas, while other arena players averaged about a twentieth of that, about $10 billion each. In total, combining both future arenas and their other businesses, nine omniscalers generated revenues of about $2.7 trillion in 2025. To put that in perspective, $2.7 trillion is larger than the GDP of Italy, the eighth-biggest economy in the world.[8]

Exhibit E5

Omniscalers span multiple future arenas.

Omniscalers' presence in future arenas in 2025[1]

■ Largest business[2] ■ Revenue-earning business ■ Pre-revenue, internal production, or equity investments[3] ■ N/A

	Alphabet	Amazon cluster[4]	Microsoft	Tesla/X cluster[5]	Meta	Apple	Samsung	Alibaba	Huawei[6]
Total in future arenas									
Number of arenas	9	8	5	5	4	3	7	5	5
Revenue, *$ billion*	380	720	150	110	200	25	75	130	10
Revenue share, *%*	95	100	50	100	100	5	20	90	10
Company capital expenditures and R&D spend, *$ billion*	150	240	100	20	130	50	70	25	25

Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Disclaimer: Arena-level data may be incomplete (some revenues aren't reported, and some initiatives aren't public or were canceled), so counts may be understated. All data is rounded.
[1]Omniscalers were top 30 spenders by R&D and capital expenditures in 2024 and earned revenues in at least three future arenas in 2024.
[2]Most yearly revenues are generated in the arena (>50%). Some companies do not have core businesses in arenas of the future, with most revenues coming from other markets (arenas of the past or non-arenas).
[3]Reporting of pre-revenues businesses, internal production activities, or equity investments may be nonexhaustive as these activities may be unreported.
[4]Including Amazon, Blue Origin, Prometheus.
[5]Including Tesla, SpaceX.
[6]Huawei's 2025 R&D spending is assumed to be the same as in 2024 as data has not yet been disclosed.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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The arenas are concentrated regionally

Arena-leading companies headquartered in the United States, China, and elsewhere point to distinct regional dynamics. In the United States and Greater China, we find more arena-leading companies and more of the ingredients that make up the arena-creation potion.[9] In the rest of the world, there are fewer companies participating in arenas. And while the companies that are active in past and future arenas have grown in market cap and revenue share everywhere, the patterns and underlying forces differ by geography.

In terms of market cap, firms headquartered in the United States lead in most arenas, reflecting deep capital markets and capitalizing on past-arena success (Exhibit E6). Firms headquartered in the Greater China region have strengthened markedly, especially in electrification, where scale, vertical integration, and manufacturing intensity underpin strong revenue positions. Those in Japan and South Korea have increased their share of market cap in future arenas, supported by industrial and consumer electronics.

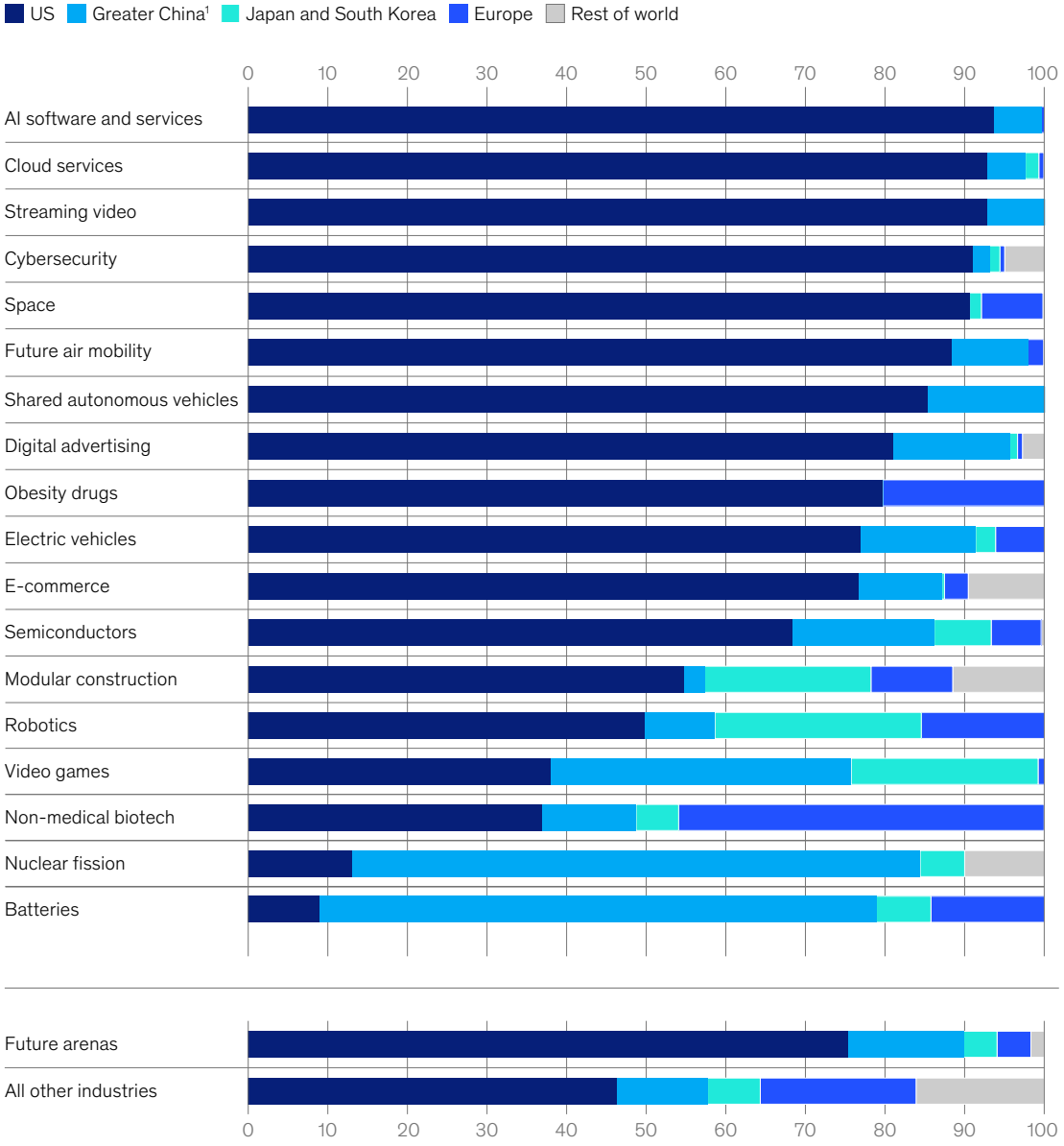
Regional differences in investment intensity, profitability, and policy regimes shape outcomes. As arenas scale, time to build—including permitting speed, grid access, and capital mobilization—is a decisive factor, alongside technological advances.

Even firms that seem to play outside the fastest-moving arenas are inevitably affected through shifts in demand, supply chains, and production systems. No business leader can remain completely insulated.

Exhibit E6

Firms headquartered in the United States hold 75 percent of global market cap in future arenas.

Regional distribution of market cap by arena, 2025, %



Note: Region defined based on headquarters location.
[1]Greater China includes Mainland China, Taiwan, Hong Kong, and Macau.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis.

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Implications for decision-makers

As the competitive intensity inside arenas escalates, grasping how this competition is evolving can offer valuable foresight today. The next big arenas of competition are closer and more consequential than they may seem. For one thing, they bring with them fresh opportunities to capture value and grow. At the same time, they are rapidly reshaping where companies compete as well as how they operate, which can have far-reaching ripple effects.

Even firms that seem to play outside the fastest-moving arenas are inevitably affected through shifts in demand, supply chains, and production systems. No business leader can remain completely insulated. If you are in an arena, the pace of change and competition is dizzying. If you are not, you risk being left behind. A better understanding of arenas can help decision-makers respond to and keep up with the accelerating pace of change.

CHAPTER ONE

Growth takes off in future arenas

From AI, cloud services, and cybersecurity to more physical realms like space, robotics, and modular construction, the 18 arenas of the future are already economically significant—and they are pulling further ahead. Data through 2025 show that each of the 18 future arenas named in the flagship report are progressing broadly in line with the scenarios we modeled for 2040, and some even faster.

Future arenas are at the center of the global growth story

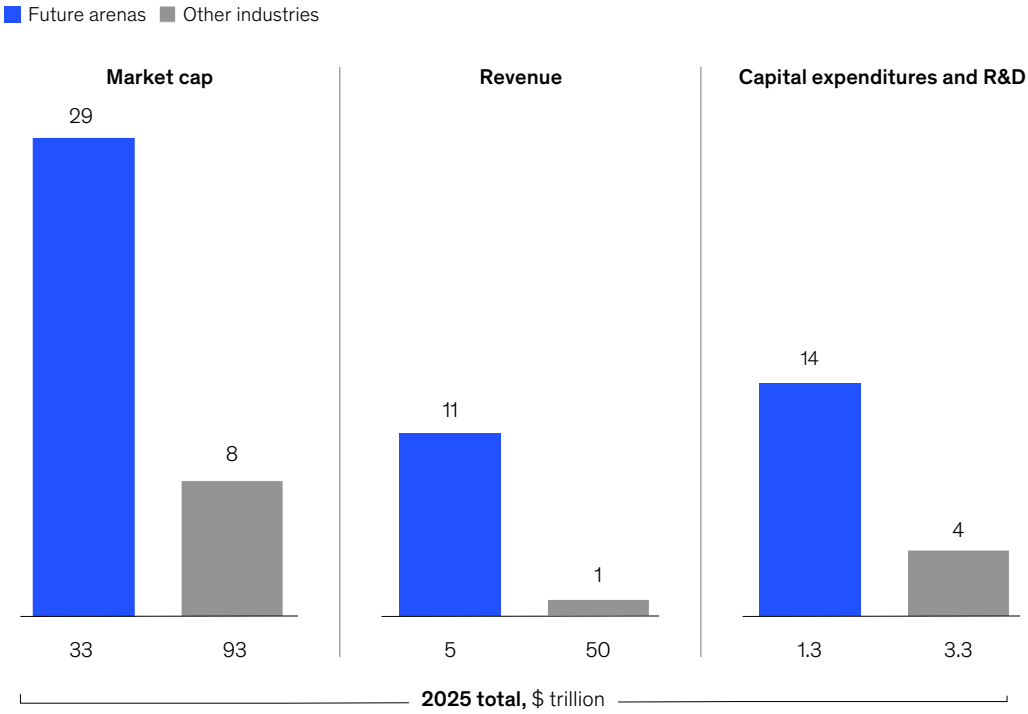
Since 2022, future arenas have expanded far faster than other industries, with market cap totals expanding four times as fast as non-arenas (29 percent per year from 2022 to 2025, compared with just 8 percent). Future arenas' revenues climbed 11 percent per year during the same period—compared with a 1 percent growth rate in non-arenas, on average (Exhibit 1). As a result, future arenas accounted for about half of total market-cap growth and revenue growth over the past few years. As of 2025, the 18 arenas represented roughly $33 trillion in market capitalization and about $5 trillion in revenues. Capital expenditure and R&D investment also grew faster over the three-year period: arenas expanded their investment spending at an annualized rate of about 14 percent, compared with 4 percent for non-arenas. By 2025, annualized investment among the arena companies exceeded $1 trillion. Arenas also earn higher returns: In our sample, future-arena companies delivered a return on invested capital (ROIC) about 1.5 times that of non-arenas.[10]

Future arenas combine the three arena-creation potion elements to fuel strong growth and high dynamism.

Exhibit 1

Future arenas are at the center of global growth.

Performance of future arenas and other industries, CAGR, 2022–25, %[1]



Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
[1]Analysis is based on a sample of 3,770 large companies globally. It covers 69 industries, including 18 future arena industries. The 2022 baseline aligns with the cutoff from *The next big arenas of competition*, McKinsey Global Institute, Oct 2024. Market-cap data covers 2022 (average of start and end of 2022) through 2025. Excluding companies with no data for capital expenditures and R&D available for 2025, but existing for 2024 (excludes 530 companies).
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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Beyond growth, rapid market-share shifts—that is, high levels of dynamism—are defining characteristics of arenas. For 2022 to 2025, we measure revenue dynamism with a "shuffle rate" of 14 percentage points for our future arenas, compared with ten percentage points for non-arenas.[11] The shuffle rate comparison means that future arenas had bigger market share shifts among top players than non-arenas. While this three-year window is too short for definitive conclusions about new entrants or sustained shifts in market share, the early signals point to more fluid competitive dynamics in arenas. One only needs to witness the constant leapfrogging of frontier AI models to see this.

There are three key ingredients that form a repeatable "arena creation" potion, which we continue to see across these industries. We first see a technology or business-model step change—not just one new idea but a new trajectory or platform. As examples, think of the discovery of GLP-1 therapies for obesity and reusable rocket launchers that minimize the cost of getting satellites into space.

Second, we see escalatory investment, with players spending at an ever-increasing pace to try to keep a seat at the table. This can be a race for primacy or even just survival as players rapidly develop capability on the new technology curve. The spend gets very big in absolute terms, but none of that matters much if the competitor spends more—a process that keeps going and shakes out those who cannot keep up. The escalatory-investment pattern is most evident in AI, but across arenas, qualitative advantages can result in both extraordinarily high investment and winner-take-most dynamics.

And third, we see a large or expanding addressable market, which may draw from an already large market—such as EVs building on the existing global automotive market or shared autonomous vehicles rerouting traffic from the taxi and rideshare markets. Alternatively, large and expanding markets can be created anew, as seen in AI software and services. The recipe still appears to work as future arenas combine the three arena-creation potion elements to fuel strong growth and high dynamism.

The arenas are pushing forward, some at warp speed

A composite picture of growth shows future arenas clearly overshadowing other industries. But what does a more detailed scorecard reveal? To measure progress, we built a bottom-up database, working from the company level (see sidebar "Methodology" and the compendium for more detailed arena-by-arena findings).

The overall story: The future arenas are largely tracking within the growth boundaries we expected, with some growing notably faster (Exhibit 2).[12] "Upper bound" (in the darkest blue) indicates fast recent growth and active reshuffling, consistent with the upper end of our 2040 prediction ranges with strong signals from the trio of ingredients. "Middle track" indicates solid momentum. "Lower bound" (in the lightest blue) indicates slower or earlier-stage progress relative to the 2040 scenarios. But note that signals of high-growth potential relative to the rest of the economy are evident in all 18 future arenas.

— *Eight arenas are racing ahead at the upper bound of the trajectory.* The AI foundation (AI software and services, cloud services, and semiconductors), plus digital advertising, cybersecurity, EVs, space, and shared autonomous vehicles all show growth consistent with the assumptions behind our higher-growth scenarios.

— *Five are advancing at the expected fast speed.* Two of these five are in the digitization cluster of industries: e-commerce and streaming video. Adoption for both is already broad; growth now comes from a mix of an expanding addressable market, especially in developing economies, and richer monetization models. Batteries, robotics, and obesity drugs are similarly tracking our 2040 scenarios.

— *Five arenas are in earlier stages of growth.* They are future air mobility, video games, modular construction, non-medical biotech, and nuclear fission. With their technology advances, investment levels, and commercialization efforts still scaling, they face headwinds before they can move up the path known as the S-curve.[13] Even so, we see step-change technologies, long-horizon capital commitments, and policy support emerging, all of which suggests the potential for arena-level growth and dynamism down the road.

Exhibit 2

Most arenas have grown within or above 2040 scenario trajectories.

Arena revenue growth scenarios with 2026 status

Future arenas[1]	Annual revenue growth rates in 2022–40 scenarios vs actual, %	Market cap annual growth, 2022–25, %[2]	Status vs 2040 scenario[3]
AI software and services	17, 25, 55	142	
Shared autonomous vehicles[4]	34	69	
Cloud services	12, 17, 18	32	
Electric vehicles	10, 12, 18	19	
Digital advertising	8, 10, 14	24	
Cybersecurity	8, 12, 13	20	
Semiconductors	6, 8, 10	42	
Space	7, 8, 10	34	
Obesity drugs	9, 15, 38	35	
Streaming video	6, 9, 11	21	
E-commerce	7, 8, 9	12	
Robotics	5, 13, 23	20	
Batteries	3, 12, 14	9	
Future air mobility	*Negligible 2022 baseline revenue*	38	
Modular construction	3, 6, 10	0	
Nuclear fission	2, 7, 13	8	
Video games	2, 5, 8	10	
Non-medical biotech	0, 5, 11	5	

Total

Future arenas	11	29
Other industries	1	8

Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
[1]Arenas are in descending order by status vs 2040 and revenue CAGR.
[2]Market-cap data covers 2022–25 (with 2021–22 used as the baseline average).
[3]Growth, dynamism, and the three arena-creation conditions are assessed to determine how a future arena is tracking. See the compendium for more details.
[4]Revenue CAGR measured vs 2023 due to negligible 2022 baseline revenue.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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In practice, many arenas are likely to follow S-shaped adoption curves—with lower CAGRs early in the life cycle, higher ones as adoption scales, and, eventually, moderated growth, until the next technology reset. Accordingly, scenario placement is determined not solely by observed revenue growth in 2022–25 but also by market-cap CAGR (a proxy for investor expectations) and the core arena-creation potion elements, which are technology step changes, escalatory investment, and market expansion. These are all considered alongside life-cycle stage and dynamism signals. While assessment inputs often align, sometimes they diverge. Where they do, we provide additional details to explain the rationale.

One example is space, which we assess as being at the upper bound despite revenue growth closer to the lower track. Actual CAGR for 2022 to 2025 was 8 percent, compared with 7 to 10 percent under the scenario for 2022 to 2040, but our upper bound assessment for space reflects its strong market-cap signals and growth catalysts, such as rising defense demand, as well as technology-driven declines in launch costs.

Another example is batteries, assessed as middle track even though revenue growth from 2022 to 2025 is on the lower end of the trajectory to 2040. That is because electrification demand for batteries remains strong, driven by higher demand for both electric vehicles and battery energy storage solutions. In 2025, installations of battery energy storage solutions topped 300 gigawatt-hours, up 50 percent year on year.[14] However, batteries' recent price declines have temporarily depressed revenues.[15]

Obesity drugs illustrate a distinct situation: Despite its 38 percent revenue CAGR (far above the scenario for 2040 of 9 to 15 percent), with price declines of roughly 25 to 40 percent between 2022 and 2024 and intensifying competition among more than 80 companies pursuing obesity treatments in 2025, CAGR could start slowing down, thus shaping the track assessment.[16]

For additional details, see the compendium.

Outside the arenas

Arenas remain the headline story. But a focus on net growth can hide an important nuance: In absolute terms, roughly half of the increase in market value and revenues from 2022 to 2025 comes from industries outside the arenas. Their gross gains are even larger before subtracting the declines that offset them over this period.

Across all industries, the net increase in revenues was about $3.1 trillion from 2022 to 2025 (Exhibit 3). Roughly $1.4 trillion of that comes from arenas (at an 11 percent CAGR). An additional $4 trillion comes from non-arena industries that are growing (about 4.3 percent CAGR). But that growth is offset by about $2.3 trillion in declines from shrinking non-arena industries (down about 4.4 percent per year).

While our arenas are typically on the right-hand side of the curve—growing faster—they are not the only pockets of growth. Some traditional industries grow fast without displaying the dynamism and competitive characteristics that define arenas. Instead, their expansion may reflect other broad drivers, namely demand tailwinds from macro-level demand drivers (as seen in healthcare and defense); continued growth from our 12 past arenas (as seen in software and payments); and postpandemic recovery (as seen in travel and leisure and air services).[17]

Sidebar

Methodology

This report builds on the analysis in MGI's 2024 report *The next big arenas of competition*, which used a company-level data set to analyze the 12 arenas that stood out from other industries beginning in 2005 in both growth and competitive dynamism. That report also identified 18 future arenas most likely to have these features in coming years and modeled industry-level revenue scenarios for all 18 of them to 2040.

For this 2026 report, we updated the company data set to 2025 and mapped companies to the 18 new arenas.[1] That enabled us to analyze the 18 arenas empirically, tracing individual companies' trajectories, and to track arenas by region. This report uses 2022 as the baseline and tracks changes through 2025 (annualized) for revenues and through December 31, 2025, for market capitalization (or the latest available 2025 valuation for private companies).[2]

Our data set covers 3,770 publicly listed and large private companies globally, representing approximately $55 trillion in revenues in 2025.[3] Revenues are allocated across 69 industries based on reported segment disclosures, filings, transcripts, and capital-markets and industry data. For example, Microsoft's revenues were split into eight industries: AI software and services, cloud services, digital advertising, video games, cybersecurity, software, hardware, and consumer electronics. Where segment detail is incomplete, allocations are estimated using publicly available information.[4]

To analyze arenas at the industry level, market cap, capital expenditures, R&D, and profitability are allocated across industries primarily based on revenue shares, with adjustments to reflect industry differences in valuation multiples, capital intensity, and margin structure. For operating cash flow, arena companies are defined as firms with more than 10 percent of revenues exposed to one or more future arenas. Private company valuations use disclosed post-money financing values where available as a proxy for market cap. All financial figures are expressed in nominal US dollars.

As in the original report, our main metrics are market cap, reflecting investor expectations about future growth, and revenues, reflecting current activity. At the same time, value is created through investment and through returns on invested capital exceeding the cost of capital; we include corresponding metrics of capital expenditures and R&D spending and ROIC or economic profit where relevant and feasible. We examine R&D and capital expenditures because they capture real asset investment that underpins future productive capacity and long-term competitiveness. In addition, we incorporate indicators of competitive dynamism (including observed market-share shifts among leading firms) to provide a fuller view of structural change.

Regional attribution is based on company headquarters (for more information, see sidebar "How we define regions—by company headquarters" in the chapter 4 regional discussion).

For more information on methodology, see the technical appendix.

[1] The data set's division into 69 industries was up from 57 industries in the 2024 report.
[2] 2025 revenue is annualized using the most recent reporting available for each company. Companies without 2025 coverage, which represent roughly $500 billion of 2024 revenues (about 1 percent of total 2025 revenues), are excluded from CAGR calculations; the impact on aggregate results is minor. Of $55 trillion in total 2025 revenues in the data set, 15 percent reflects companies with four quarters of reported data; 60 percent reflects companies with three quarters (annualized); and the remainder reflects companies with one or two quarters of data, split roughly evenly between the two.
[3] Company inclusion criteria are aligned with the 2024 report (minimum market capitalization of $3.5 billion in 2005 or $5.0 billion in 2020). For the 2026 update, we additionally include the top 4,000 companies by market capitalization in 2025, selected material private companies (where reliable valuation and financial data are available), and a small set of firms deemed strategically significant to emerging arenas.
[4] For chapter 3, we also track early-stage initiatives, though disclosure is uneven. As a result, we do not claim an exhaustive identification of all potential omniscalers, and thresholds may be refined as better data become available.

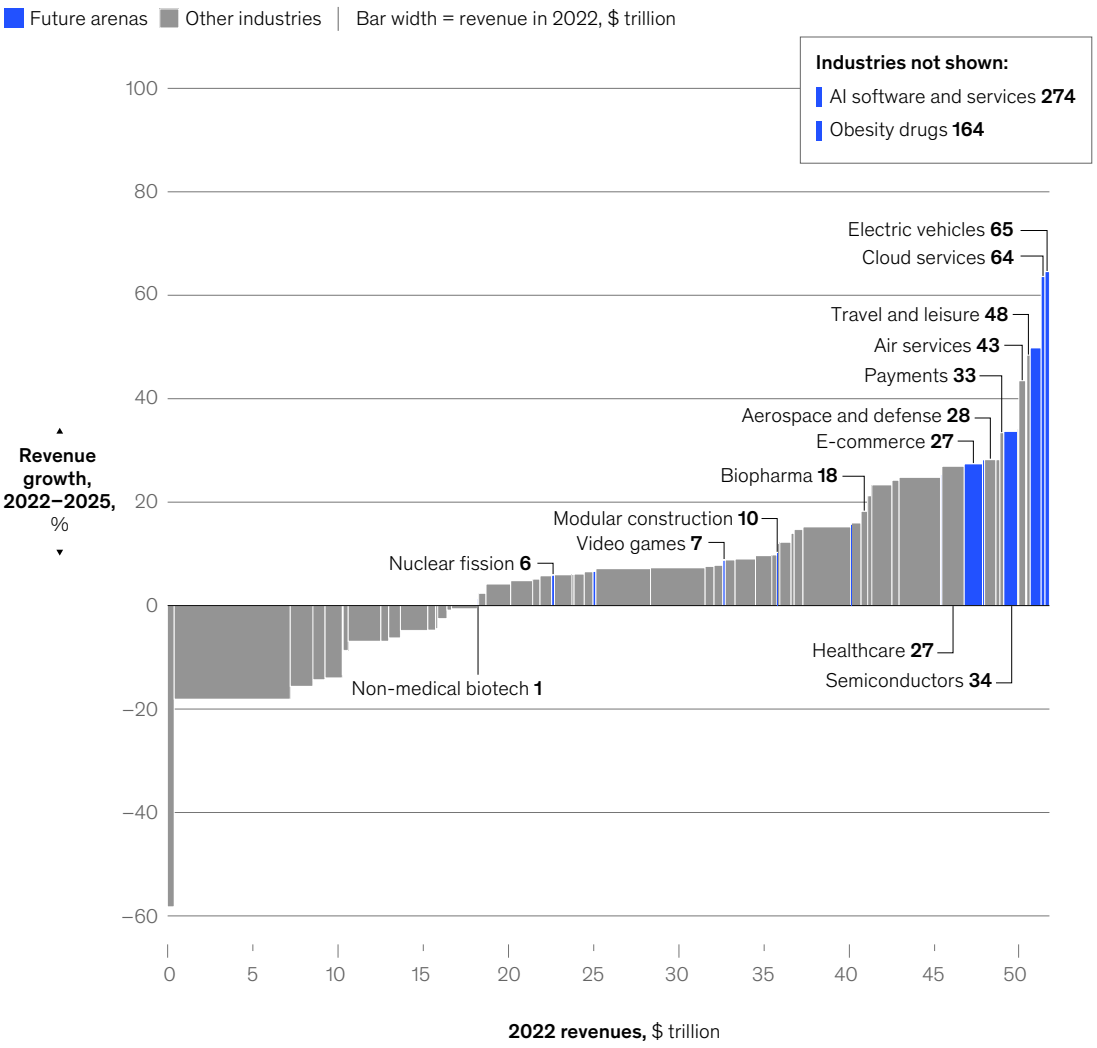
As the industrial landscape continues to evolve rapidly, other industries could reach arena status. At the same time, we could be wrong that the 18 future arenas tracked here will maintain the highest growth and dynamism in the years ahead. In the original report, we identified eight almost-emergent arenas—industries that show some ingredients of arena formation but face greater uncertainty about growth or dynamism. They are clean hydrogen, lower-carbon materials, products and services for older adults, nuclear fusion, renewables equipment and infrastructure, sustainable fuels, virtual and augmented reality, and Web3 (including decentralized finance).[18] As technology trajectories evolve, other domains may also warrant monitoring, even if commercial impact remains uncertain today. For example, quantum technology is surging and could have significant revenues in the period to 2040 and multiple times more value added through industries like finance, pharmaceuticals, and cybersecurity.[19] But significant hurdles and uncertainty remain.[20]

Collectively, the shift in value toward the 18 future arenas is staggering. Compared to 20 years ago, they are now five times more important as a share of market capitalization and revenue among the companies in our data set.

Exhibit 3

Future arenas are most of the fastest-growing industries.

Total revenue increase by industry, 2022–25, %



Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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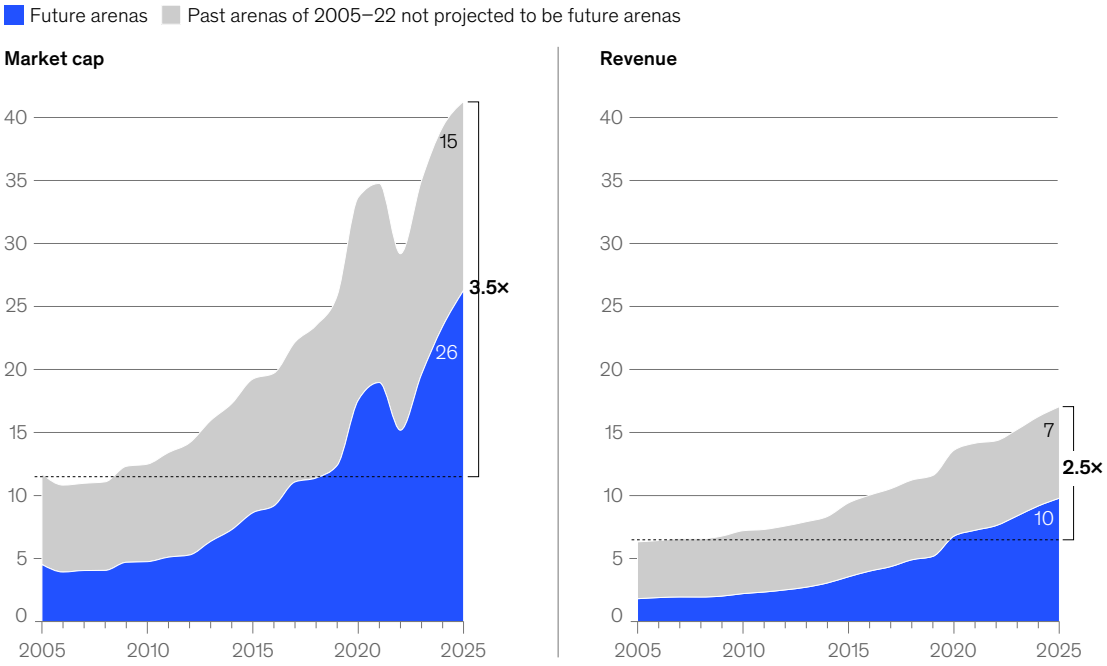
We're all in arenas now: These fast-moving industries matter for everyone

Collectively, the shift in value toward the 18 future arenas is staggering (Exhibit 4). Compared to 20 years ago, they are now five times more important as a share of market capitalization (from 5 to 26 percent) and revenue (from 2 to 10 percent) among the companies in our data set. The picture is even starker when we add the matured past arenas, denoted in gray on the charts. Past arenas include such industries as payments and industrial electronics, which previously qualified as arenas but didn't make the cut because growth and dynamism show signs of stabilizing. Past and future arenas combined exceed 40 percent of all market capitalization today, up from about 12 percent in 2005.

Exhibit 4

Arenas tripled market-cap share and doubled revenue share.

Arenas share, 2005–25, % of database



Note: Database covers 85% of total global market cap (based on Dec 2025 data, when global market cap was estimated at $148 trillion).
Source: World Federation of Exchanges; McKinsey Value Intelligence; McKinsey Global Institute analysis

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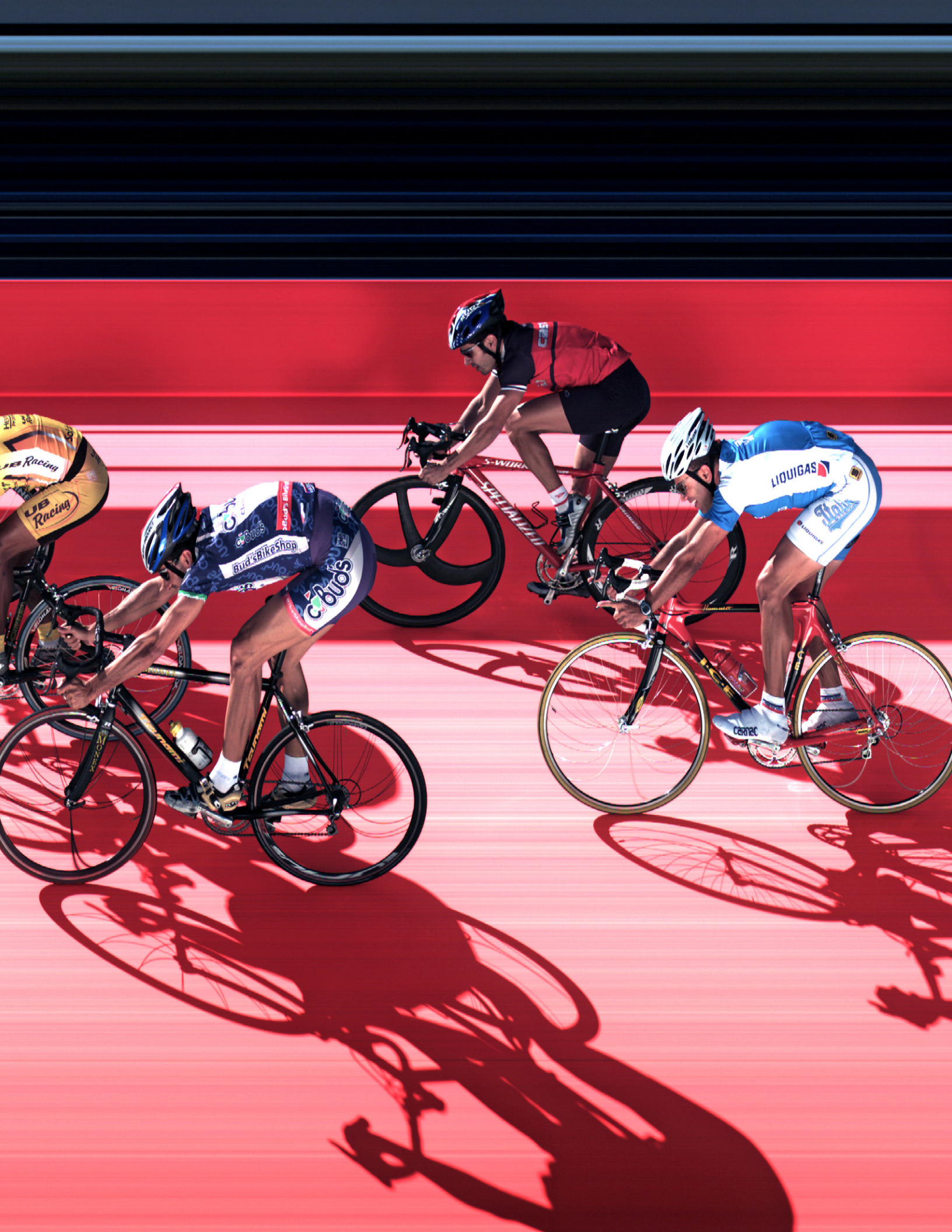

JB Racing
Bud's BikeShop
LIQUIGAS

CHAPTER TWO

Arenas are reshaping the industrial landscape

This chapter examines the 18 future arenas and explores the themes that are driving outsize growth. Here we find that AI is increasingly emerging at the heart of the new arenas landscape.

Five themes reveal differences in future arenas

In this chapter, we group the 18 future arenas into five themes to make broader patterns easier to spot (Exhibit 5). The five themes are: AI foundation, digitization, electrification, hard tech, and new bio-frontiers.

We define the AI foundation as semiconductors, cloud services, and AI software and services—the companies that are driving artificial intelligence across industries. Digitization encompasses e-commerce, digital advertising, video games, streaming video, and cybersecurity; electrification represents nuclear, EVs, and batteries; hard tech accounts for robotics, shared autonomous vehicles, future air mobility, space, and modular construction; and new bio-frontiers covers non-medical biotech and obesity drugs. Across all clusters and themes, AI often acts as an accelerator by improving performance, lowering costs, and enabling technology resets.

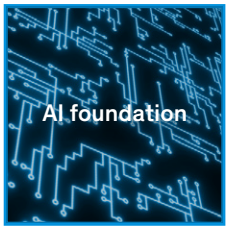
These categories are an analytical simplification: Cloud services are hardly AI-only, digitization continues to drive heavy demand, and semiconductors power far more than cloud operations. We nevertheless group semiconductors and cloud in the AI foundation because this arrangement best correlates the underlying trends driving the dynamics. Similarly, some arenas within a theme are more related than others. For example, a subset of hard tech—including shared autonomous vehicles, future air mobility, and new robotics—can also be viewed as physical AI, or systems built to "sense, think, and act" in the real world, thanks to sophisticated sensors and other AI-enabled technologies, while space and modular construction are less related. Keeping this caveat in mind, the five themes are used as the organizing frame for the analysis that follows.

Since 2022, the future arenas have added about $18 trillion in market cap and $1.4 trillion in revenue. But note that these gains are highly concentrated by theme. Of the $18 trillion in incremental market cap, the AI foundation accounts for $11 trillion (about 60 percent of the total), with the digitization theme contributing an additional $5 trillion. Of the $1.4 trillion in revenue growth, digitization contributes $700 billion (nearly half), with the AI foundation bringing in $500 billion and electrification roughly $200 billion. Hard tech and new bio-frontiers are the themes that include more arenas that are earlier on the S-curve.

Exhibit 5

Future arenas added about $18 trillion in market cap in three years.

Incremental revenue and market cap between 2022 and 2025, $ billion[1]

Theme	*Total by theme* Revenue increase	*Total by theme* Market-cap increase	Market-cap increase by arena	
 AI foundation	490	10,770	Semiconductors	7,388
			Cloud services	1,831
			AI software and services	1,554
 Digitization	680	4,900	Digital advertising	3,070
			E-commerce	773
			Streaming video	407
			Cybersecurity	363
			Video games	284
 Electrification	190	930	Electric vehicles	786
			Batteries	104
			Nuclear fission	38
 Hard tech	30	560	Space	395
			Robotics	101
			Shared autonomous vehicles	51
			Future air mobility	15
			Modular construction	0.3
 New bio-frontiers	50	630	Obesity drugs	614
			Non-medical biotech	14
TOTAL, $ billion	1,430	17,790		

Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
[1]Market-cap data covers 2022–25 (with 2021–22 used as the baseline average). For private companies without a market cap, company valuations are used interchangeably. Figures may not sum due to rounding.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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An AI wave is rising atop a still-surging digital wave

AI foundation

The AI foundation is clearly the fastest-growing category by market value, boosted by rising valuations of private leaders such as OpenAI, Anthropic, and xAI.[21] The AI foundation's share of total market value in our universe of large companies doubled from about 6 percent in 2022 to about 13 percent by the end of 2025 (Exhibit 6).

Market-cap and valuation gains are only part of the story. Revenues rose as well, but more modestly: The AI foundation's share of revenue across industries increased from about 2 percent to about 3 percent. In absolute terms, AI foundation companies added about $11 trillion in market value on roughly $500 billion of incremental revenue.

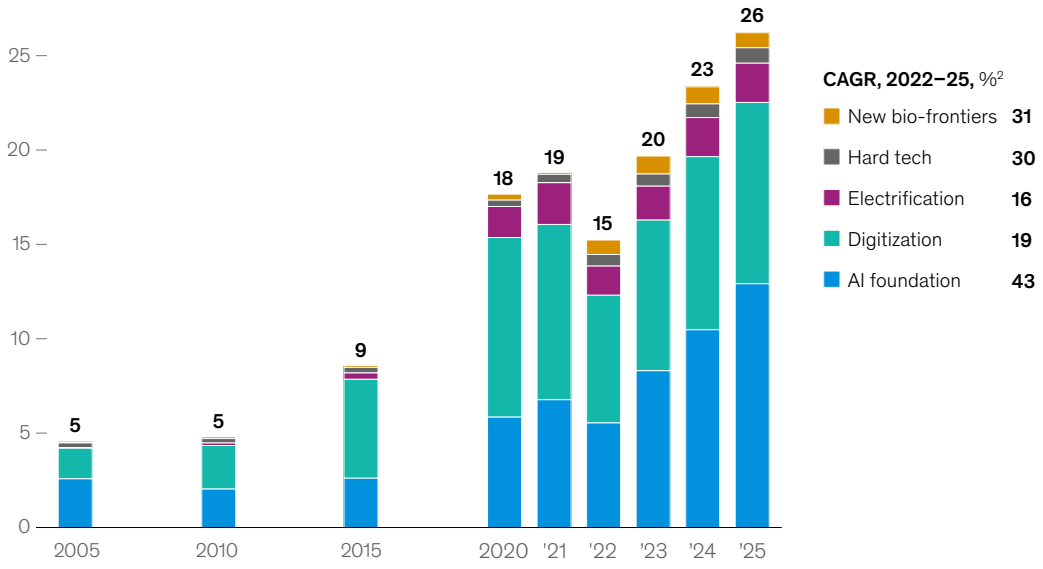
Recent disclosures suggest that revenue momentum is building. Anthropic has stated that its run-rate revenue is growing more than tenfold annually and is now about $14 billion.[22] Nvidia's revenues expanded rapidly, from $27 billion in fiscal 2023 to more than $200 billion for fiscal 2026, implying that revenues have nearly doubled on average each year over the period.[23]

Nevertheless, the gap between market-cap and revenue growth reflects investor expectations for the future, expectations that will ultimately need to be validated through sustained returns on invested capital above the cost of capital. Whether the current AI investment cycle will generate returns commensurate with the capital deployed is among the most consequential open questions in business. Forty percent of market-cap growth is explained by Nvidia's valuation climbing by roughly $4 trillion from 2022 to 2025 as the company added $170 billion in revenues. At the close of 2025, Nvidia alone was worth more than the entire listed semiconductor industry in 2022.[24]

Exhibit 6

AI foundation has driven the most market-cap growth since 2022.

Arenas' market-cap share by theme as of December 31 for selected years, % of database[1]



[1]Themes include the following industries: AI foundation (semiconductors, cloud services, and AI software and services), digitization (e-commerce, digital advertising, video games, streaming video, and cybersecurity), electrification (nuclear fission, EVs, and batteries), new bio-frontiers (non-medical biotech and obesity drugs), and hard tech (robotics, shared autonomous vehicles, future air mobility, space, and modular construction). In 2022, market-cap declines were observed in select sectors including information technology, communication services, and e-commerce.
[2]CAGR is calculated using average market cap in 2022 (average of beginning and end of year) through 2025.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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Similar growth in the AI foundation is visible in investment (Exhibit 7). The AI foundation's share of total capital expenditures and R&D rose by about three percentage points (from 11 percent to 14 percent), accounting for much of the overall increase in future arenas' investment share (from 23 percent to 28 percent) and roughly matching the rise in digitization (from 7 percent to 10 percent).[25]

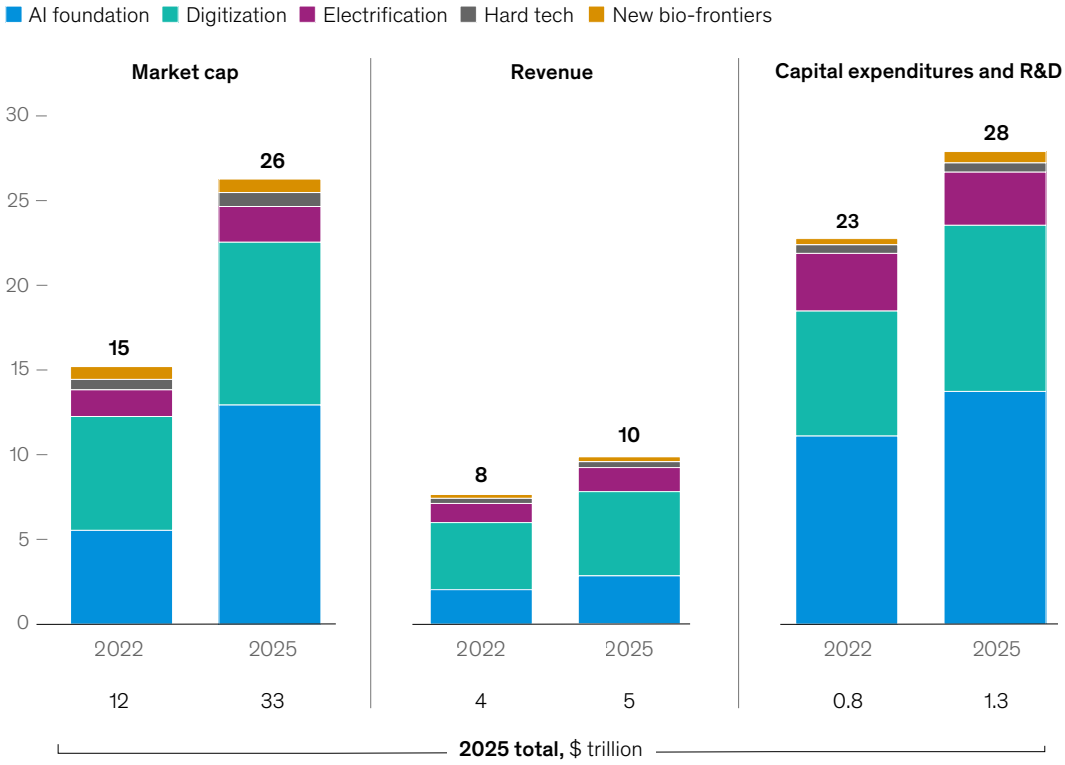
Escalatory investment is a core ingredient in the arena-creation potion, and in the current cycle, AI demand is amplifying it, particularly through spending on computing power in the form of data centers and semiconductors. Among a small set of seven companies (Amazon, Alphabet, Meta, Microsoft, TSMC, Oracle, and Nvidia) with businesses in the AI foundation theme and outsize R&D and capital expenditures, total investment escalated from about $15 billion in 2005 to close to $750 billion in 2025—50 times higher over two decades, and more than 90 percent above the level in 2022 (Exhibit 8).[26] To gauge the magnitude, $750 billion represents about 11 percent of total US federal outlays in fiscal year 2025 and exceeds total public spending on US transportation and water infrastructure in 2023.[27] Another way to look at it is as more than two entire Apollo programs per year (in today's dollars)—and the Apollo project took 13 years.[28]

Most of those companies have announced sharp increases in capital investment for 2026. Alphabet, Meta, and Amazon have each indicated 2026 capital expenditures exceeding $100 billion, and each implies an increase of more than 50 percent over 2025. If current forecasts hold, the seven companies' combined R&D and capital expenditures could be close to $1 trillion in 2026, more than 30 percent above 2025's level.[29]

Exhibit 7

AI foundation has driven the most growth since 2022.

Arenas share by theme, 2022–25, % of database[1]



[1]Themes include the following industries: AI foundation (semiconductors, cloud services, and AI software and services), digitization (e-commerce, digital advertising, video games, streaming video, and cybersecurity), electrification (nuclear fission, EVs, and batteries), new bio-frontiers (non-medical biotech and obesity drugs), and hard tech (robotics, shared autonomous vehicles, future air mobility, space, and modular construction). In 2022, market cap declines were observed in select sectors including information technology, communication services, and e-commerce.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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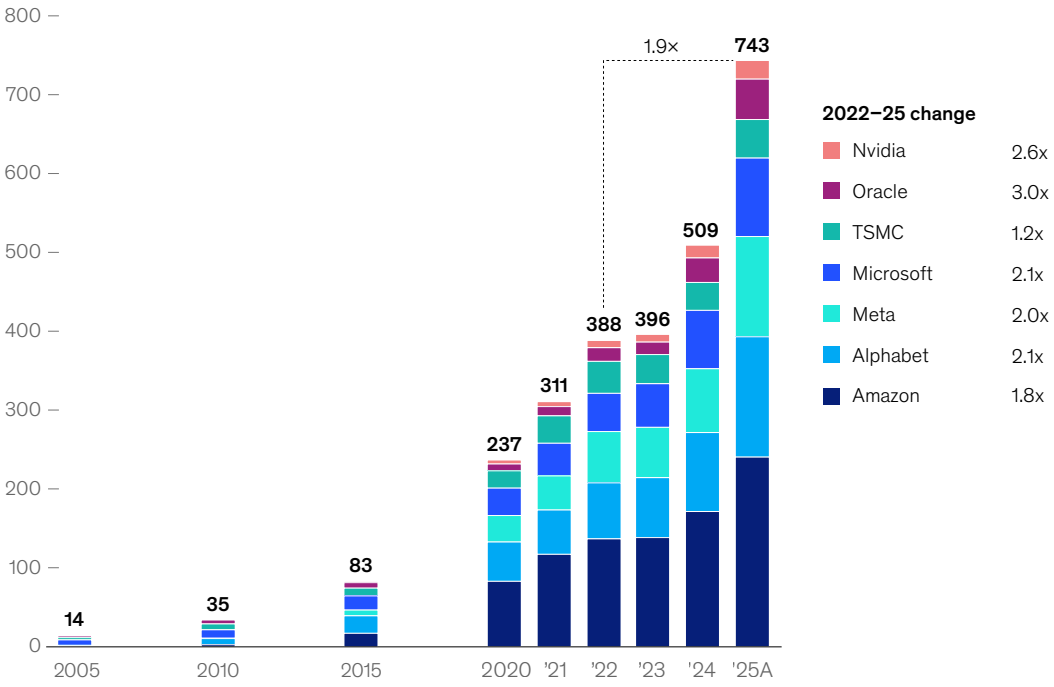
So far, realized economic value in the AI and chip value chain has been unevenly distributed, with a significant share accruing to chip designers (notably Nvidia), foundries, and hyperscale cloud providers that can deploy and monetize computing power at scale. At the same time, profit pools remain dynamic. Even between 2024 and 2025, value creation has shifted across segments alongside overall growth—for example, with a recent increase in memory (Exhibit 9).[30]

Within semiconductors, Nvidia graphics processing units (GPUs) are widely used for training many state-of-the-art AI models.[31] High demand is reinforced by Nvidia's CUDA programming model and its deep library stack, which makes GPUs easier to program and keeps workloads highly optimized across AI frameworks. This ecosystem integration can increase switching costs and helps explain Nvidia's industry-leading gross profit margins of approximately 75 percent in 2025, though the company expects a lower margin in 2026.[32]

Exhibit 8

AI foundation leaders have nearly doubled investment since 2022.

Total capital expenditures and R&D spend, $ billion



Note: 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Companies are selected based on the largest incremental increase in capital expenditures and R&D spend within the AI foundation.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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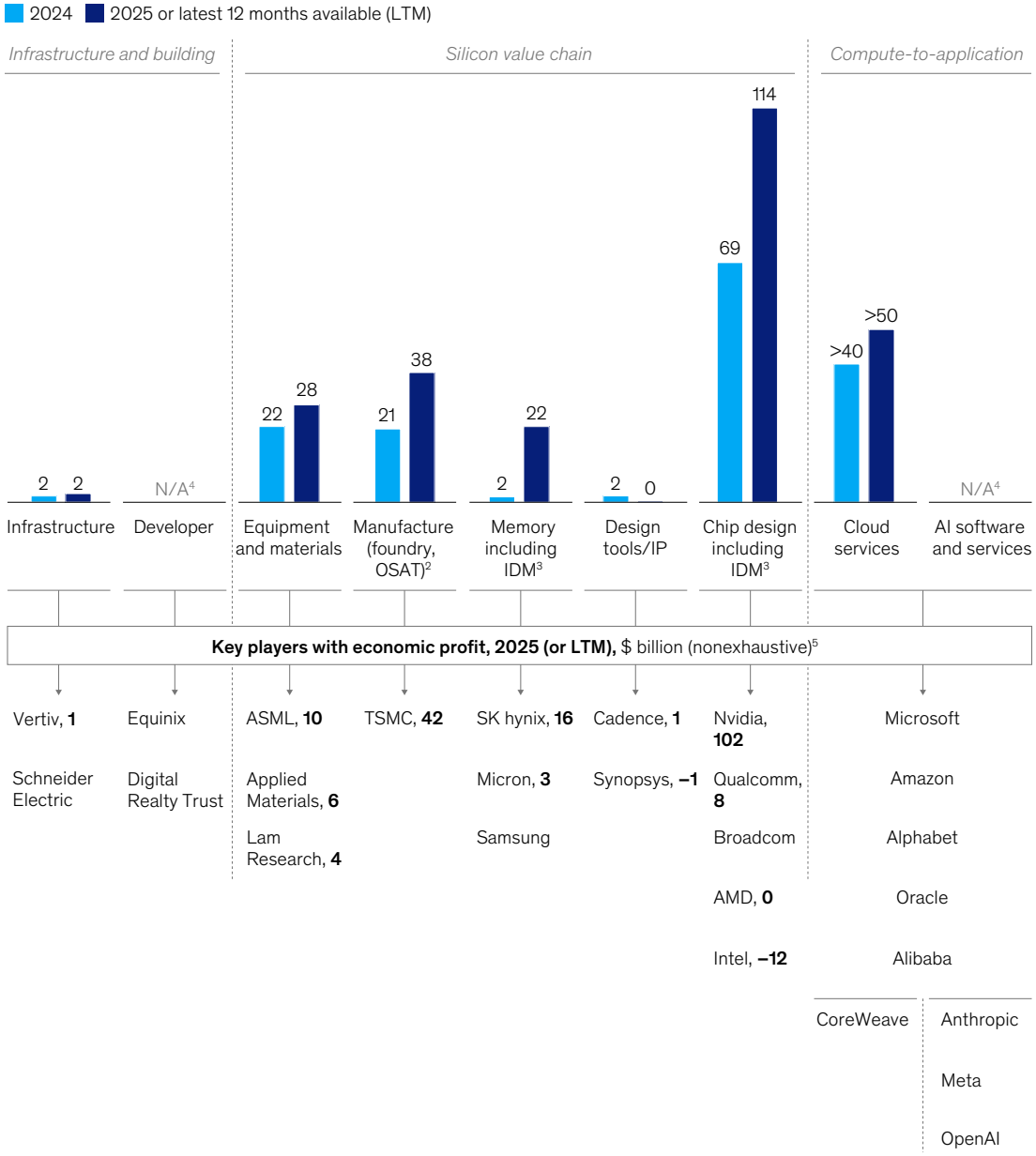
Leading-edge chip manufacturing also holds large value. TSMC's foundries operate at relatively high gross margins (approximately 60 percent), reflecting the scarcity of advanced capacity.[33] Further upstream in the AI value chain, margins vary widely. ASML's gross margins sit at about 50 to 53 percent.[34] Other segments show more variability in performance. In memory, for example, players are seeing steep increases in profits and cash. For example, Micron's gross margin was about 22 percent in fiscal 2024 and rose to about 40 percent in fiscal 2025, swinging from a loss in fiscal 2023 to positive net income in fiscal 2024 as performance improved.[35] Among hyperscalers, gross margins are relatively high compared with the rest of the chain; for example, Microsoft Cloud reported a gross margin of about 69 percent in 2025, though it noted margin headwinds from scaling AI infrastructure.[36]

Looking ahead, it is uncertain where margins will concentrate next as the AI value chain evolves (see sidebar: "Investment moves across the AI value chain to address key constraints"). Will they accrue to new AI software players as their platforms scale and reach widespread adoption or will those models become commoditized? Will profits remain anchored with chip designers and other hardware leaders? Different scenarios paint very different pictures of how value will be generated and distributed in the future, and while the answer is not yet clear, the question remains one of the most exciting.

Exhibit 9

Across the AI chip and compute value chain, profits have grown, with the highest levels to date in chip design and cloud services.

Economic profit per value-chain step including goodwill, $ billion[1]



[1]Energy players are excluded. The AI chip and compute value chain includes only revenue-generating companies (eg, does not include in-house chip production) and is not limited to AI/compute applications. Players are shown in the value-chain segment that best reflects their primary operating role. Economic Profit (EP incl goodwill) shown for pure-play companies. For diversified companies, EP estimated as segment NOPLAT minus capital charge (WACC × estimated IC). For players without reported data, economic profit is for fiscal year 2025 or the latest 12 months available (LTM) up to the end of 2025. See the technical appendix for details.
[2]OSAT stands for outsourced semiconductor assembly and test.
[3]IDM stands for integrated device manufacturer.
[4]Omitted due to measurement limits.
[5]LTM through Sept 2025 for SK hynix.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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Inside the arena

Investment moves across the AI value chain to address key constraints

Capital is increasingly being deployed across the AI stack and is flowing into its enablers, especially power, data centers, and data-center infrastructure (Exhibit 10). In many recent deals, financing is directly tied to capacity. For instance, Nvidia has been deepening its financial relationships with "neocloud" providers such as CoreWeave to build more computing capacity.[1] Alongside capacity-linked deals, hyperscalers and AI-model developers are forging and strengthening partnerships for strategic positioning. Amazon invested $8 billion in fast-growing AI-model start-up Anthropic while making Amazon's AWS the primary cloud and training partner for Anthropic.[2] Microsoft's relationship with fellow AI-model developer OpenAI is more complex: Their deals combine strategic alignment and product integration with large-scale cloud commitments, but OpenAI is not exclusive to a single infrastructure route.[3]

AI value-chain economics may not stay where they are today. Constraints are shifting. Infrastructure is one growing issue. Not long ago, data-center expansion could tap spare grid capacity, but that cushion has largely disappeared.[4] Previous McKinsey research found that power availability and lead times for grid connections were already slowing down data-center expansions globally, but the problem has grown more complex thanks to data-center build timelines, grid-interconnection queues, and broader energy supply chain issues.[5] At times, no amount of investment can unlock the gates to get enough power. To overcome infrastructure obstacles, industry leaders like Microsoft and Google are investing heavily in power and cooling. New data centers are being planned for sites where hyperscalers can secure long-term energy while exploring custom accelerators, heat reuse, and other efficiency measures.[6]

At the same time, access to AI-capable chips (especially Nvidia's graphics processing units) and the advanced packaging and high-bandwidth memory needed to scale them are serious bottlenecks.[7] Hyperscalers are aiming to lower their reliance on GPUs over time by developing in-house chips, making long-term capacity arrangements, and shifting more of AI's work (inference) onto their own stacks.[8]

The scarcity of high-quality data for training is also a growing problem. Beyond public or open data, which is quickly being depleted, there is more that can be licensed. Beyond that, much of the remaining stock is private or sits in fragmented private repositories.[9] To confront these "data walls," focus is shifting toward acquiring proprietary data sets, synthetic data, and multimodal expansion.[10]

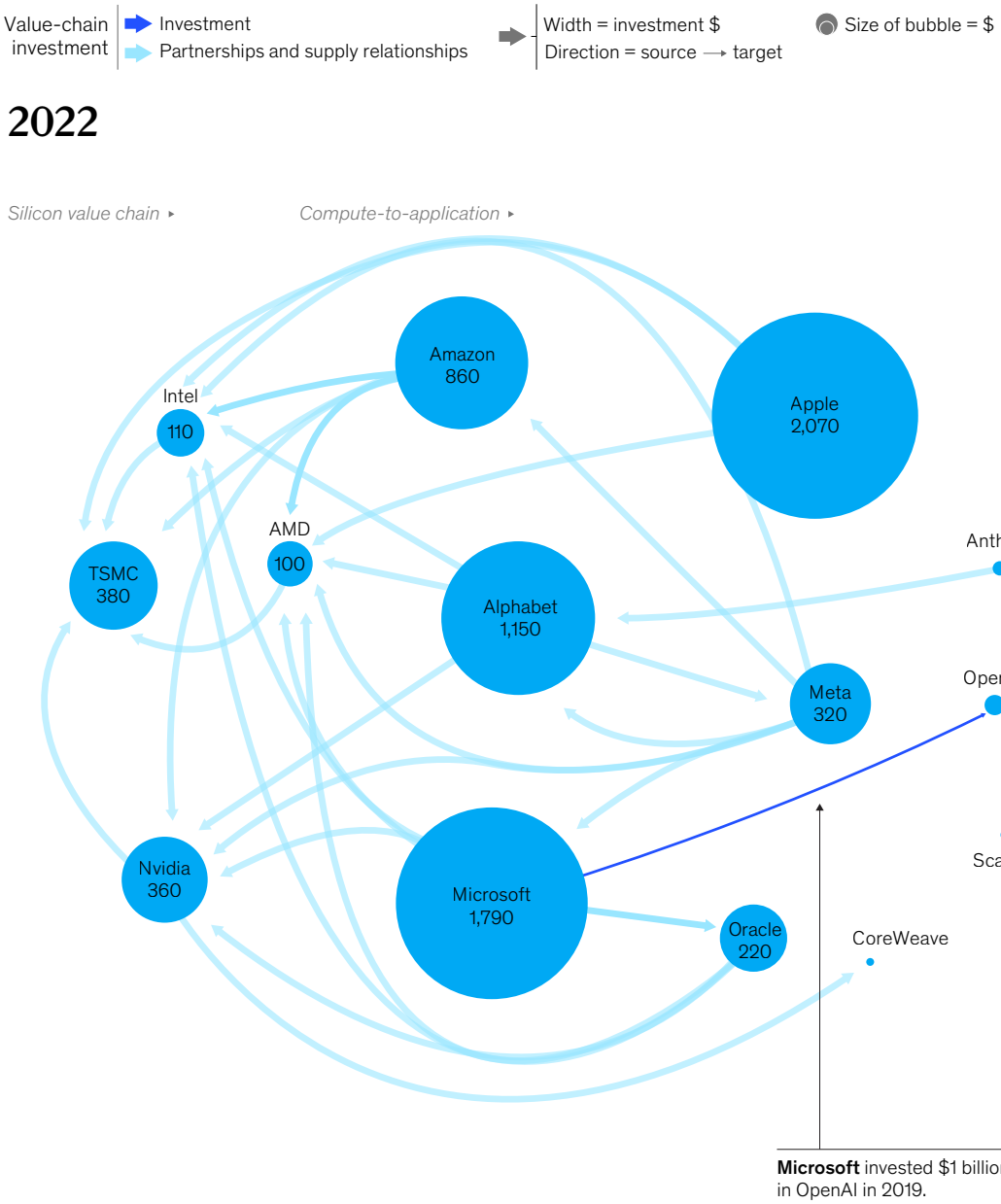
As interdependencies, partnerships, and bottlenecks shift, so too will the map of the AI value chain.[11]

[1] "Neoclouds," described as GPU as a service (GPUaaS) providers, have emerged to address the need for more computing power during the GPU shortage while allowing advanced chip providers to diversify their revenue streams. See Massimo Mazza, Pankaj Sachdeva, Suren Arutyunyan, and Tarik Alatovic, "The evolution of neoclouds and their next moves," McKinsey, November 19, 2025. In January 2026, Nvidia said it would invest $2 billion in neocloud CoreWeave to help accelerate the build-out of AI factories, aiming to provide five gigawatts of capacity by 2030. See "NVIDIA and CoreWeave strengthen collaboration to accelerate buildout of AI factories," Nvidia, January 26, 2026.
[2] "Powering the next generation of AI development with AWS," Anthropic, November 22, 2024.
[3] Berber Jin and Corrie Driebusch, "The $14 billion question dividing OpenAI and Microsoft," *The Wall Street Journal*, October 18, 2024.
[4] Christopher Tozzi, "Why data center grid connections are slowing down—and how to fix it," Data Center Knowledge, March 17, 2025.
[5] "The role of power in unlocking the European AI revolution," McKinsey, October 24, 2024; "The cost of compute: A $7 trillion race to scale data centers," McKinsey, April 28, 2025; Adam Wilson, "Grid congestion remains key issue as data center load growth stresses system," S&P Global Market Intelligence, October 16, 2025.
[6] Microsoft signed a 20-year power purchase agreement with US nuclear power player Constellation, while Google invested €1 billion to expand a data center in Finland, including a heat-recovery project feeding the local district-heating network. The Microsoft deal with Constellation is to restart nuclear power generation at Three Mile Island Unit 1, adding approximately 835 megawatts of carbon-free power capacity. "Constellation to launch Crane Clean Energy Center, restoring jobs and carbon-free power to the grid," Constellation, September 20, 2024; "Google announced €1 billion expansion of Hamina Data Center and new heat recovery project," FDCA, May 24, 2024.
[7] Jaime Sevilla et. al., "Can AI scaling continue through 2030?," Epoch AI, August 20, 2024.
[8] "AWS Trainium," Amazon Web Services, accessed February 22, 2026; *Google Blog*, "Ironwood: The first Google TPU for the age of inference," blog entry by Amin Vahdat, April 9, 2025.
[9] Pablo Villalobos et al., "Will we run out of data? Limits of LLM scaling based on human-generated data," Epoch AI, June 6, 2024.
[10] Synthetic data is algorithmically generated data used to augment or substitute real training examples (helpful for privacy, scale, and rare cases). Multimodal expansion means training models on multiple data types (text, images, audio, and so forth) or aligned pairs so they can learn cross-modal capabilities.
[11] While geopolitical issues are beyond the scope of this report, previous research by MGI finds that foreign direct investment (FDI) pledged to build advanced manufacturing capacity, such as semiconductor fabs, has increasingly followed geopolitical lines, with repercussions for the future map of international business. See *The FDI shake-up: How foreign direct investment today may shape industry and trade tomorrow*, McKinsey Global Institute, September 22, 2025.

Exhibit 10

Downstream ties are tightening in the chip value chain.

Select technology companies, market cap, $ billion[1]



[1]Market-cap data covers calendar year 2022 year-end. Valuations are based on publicly available data as of year-end 2022.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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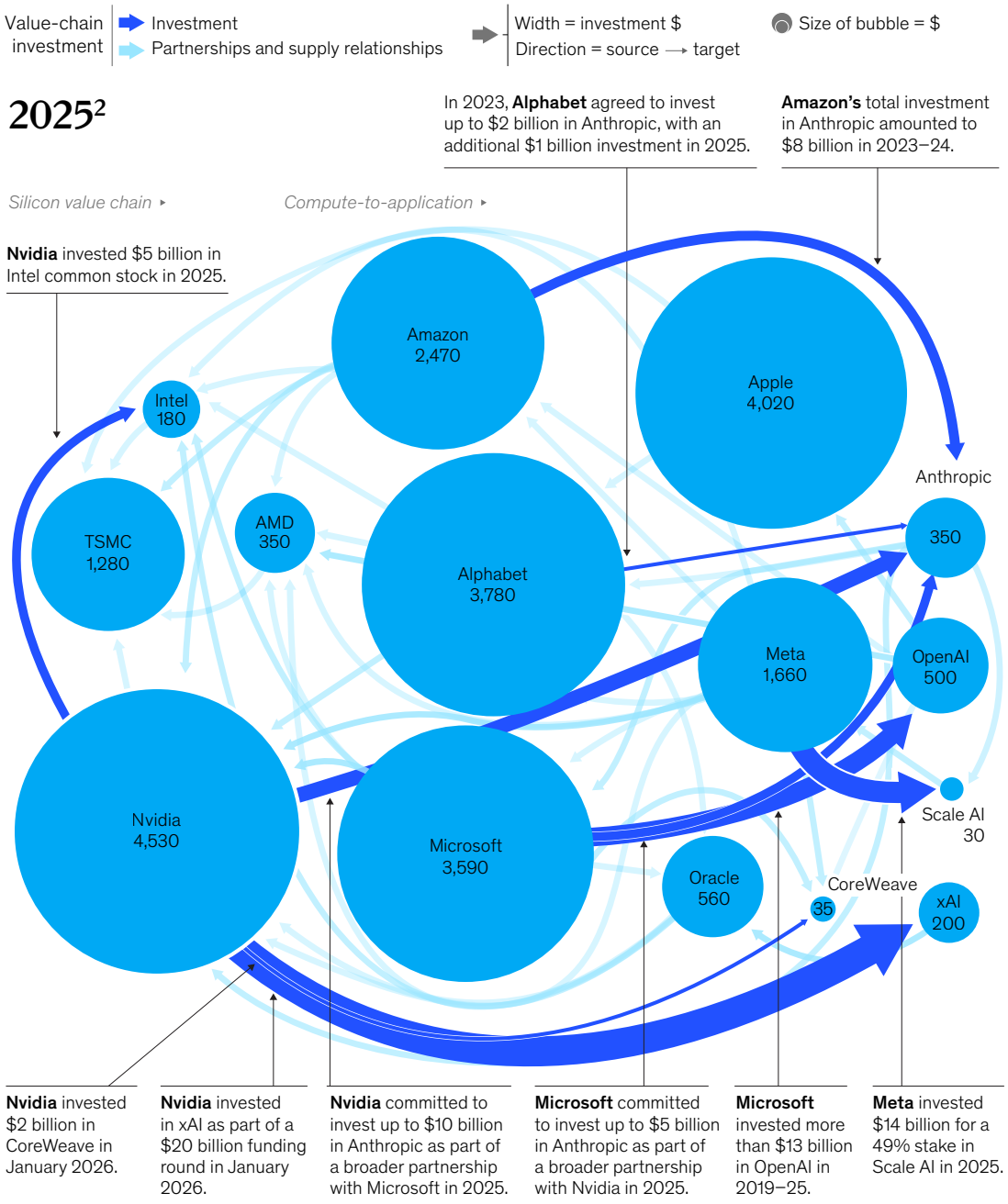
Exhibit 10 (continued)

Downstream ties are tightening in the chip value chain.

Select technology companies, market cap, $ billion[1]



[1]Market-cap data covers calendar year 2025 year-end. Valuations are based on publicly available data as of year-end 2025.
[2]Includes investments announced in Jan 2026.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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Digitization is supercharged by AI and emerging markets

Digitization

The digitization theme was the second-largest contributor to growth after the AI foundation. For the five digital arenas that make up this theme, revenue rose by 10 percent a year from 2022 to 2025, often from an already large base. Meanwhile, market caps continued compounding double-digit gains through 2025 (growing about 10 to 12 percent per year in e-commerce and video games, and roughly 20 to 24 percent per year in cybersecurity, digital advertising, and streaming video).

Global industries, with well-known incumbents and sizable annual revenues, can make digitization look mature at first glance. Several arenas have moved from rapid adoption to scale economics, where gains come from monetization and efficiency rather than growth in first-time users. Streaming video illustrates the shift: After a decade of subscriber-led expansion, many leading platforms are now emphasizing profitability through pricing, bundling, and ad-supported tiers and are competing more directly with one another.

Yet the digitization arenas continue to be reshaped by successive waves of disruption, which are still propagating through business models and market structure. Arena boundaries are blurring as firms compete for scarce attention, LLM-led interfaces are changing how online content is accessed, and emerging markets are adding to demand as even more households come online.

McKinsey's 2025 report *The 'attention equation'* shows how the digitization arenas are interlinked. Industry boundaries are defined not only by products and services but by a scarce, valuable input—consumer attention. Attention, understood as valuable time spent and shaped by focus and intent, varies in monetizable potential, with higher-intent engagement commanding greater value (see sidebar "E-commerce and games in the battle for attention").[37] Consequently, digital players are moving fluidly up and down the value chain and across the digitization arenas. Content-led digital platforms like TikTok and Instagram are moving downstream into commerce.[38] Streaming platforms like Netflix and Amazon Prime are scaling ad-supported business models.[39] Legacy ad and search players like Google are shifting more spending toward video feeds, with YouTube accounting for more than 12 percent of all TV viewing in the United States in May 2025 and much of that attention captured by independent creators rather than traditional media studios.[40] At the same time, multiple offline brands are building in-house digital-media capabilities to produce their own content. The result is a set of increasingly integrated ecosystems competing to control customer attention, transactions, and the data that connect them.

In this dynamic context, AI is creating disruptions across digital media. Chatbots that can return detailed, useful responses to complex user queries are disintermediating the open-web journey, reducing click-through traffic from searches at the expense of the publishers that rely on them.[41] In advertising, AI is compressing creative cycles and enabling increasingly automated, real-time targeting and bidding. It also risks upending established content creation practices, with the potential to accelerate a shift to user-generated content and democratize access to high-end content creation—or generate a tidal wave of worthless AI slop.[42] Meanwhile, movie and video-game studios are already using AI to save costs in development and preproduction, even as debates over creative talent displacement, IP rights, and AI bias intensify.[43]

Cybersecurity is an arena where AI is already raising both risk and demand, making security for AI and AI for security twin priorities.

Agentic commerce could become the next major reset in digitization by unbundling the integrated ecosystems many companies have spent a decade building. Firms are getting better at monetizing attention, data, and transactions within tightly integrated environments, yet the same AI innovation race may erode those advantages by shifting digital journeys from "browse and choose" to "delegate and execute." If AI agents become the default front door for discovery and purchasing, control could move from today's platforms to whoever runs that agent experience and sets its defaults—whether operating systems, marketplaces, model providers, or payment platforms—recasting customer access, demand steering, and value capture across the digital stack.[44]

Cybersecurity is an arena where AI is already raising both risk and demand, making security for AI and AI for security twin priorities. As organizations embed AI into their systems, the attack surface expands as new models, APIs, data pipelines, and third-party integrations create additional components and decision points to secure. At the same time, attackers can use AI to facilitate phishing, impersonation, payload delivery, and exploit discovery. Continuing the loop, corporations are deploying AI in their defense to improve detection and response. Quantum computing is also emerging as a swing factor for cybersecurity growth. The "Q-Day"—when sufficiently powerful quantum machines could break today's widely used public-key encryption—can accelerate investment in quantum-safe cryptography and quantum-secure communications.[45] Regulation is also lifting cybersecurity's baseline. The EU's Digital Operational Resilience Act, US regulator- and state-level cybersecurity requirements, and emerging AI-safety standards are among the measures that encourage more corporate spending on identity and access management, cloud security, data protection, and other cybersecurity offerings.[46] And multiplying attacker capabilities are only one vector of cybersecurity risk from AI. Agentic systems that operate across applications may require broad, ongoing access to devices and sensitive data, expanding attack surfaces and straining established identity, governance, and privacy safeguards.[47]

Amid these shifts, emerging markets remain core engines for growth as their addressable bases expand. Two main drivers of this growth are increasing connectivity, with more people online, and easier monetization with digital payments, particularly in Southeast Asia and parts of the Middle East and North Africa region.[48] In Southeast Asia, multiple countries experienced double-digit annual growth of e-commerce's gross merchandise value between 2023 and 2024.[49] In India, e-commerce has scaled rapidly, while still having considerable room for growth; only 20 to 25 percent of Indian internet users shop online.[50]

E-commerce is increasingly crossing borders, despite some tightening of trade rules. This global interconnectivity is raising the competitive bar and sometimes compressing prices as companies ship large volumes internationally.[51] Similar growth trends are visible beyond e-commerce. In video games, for example, growth is increasingly concentrated in emerging regions, including Latin America and the Gulf Cooperation Council countries, where large investments are backing digital ecosystem build-outs.[52]

Inside the arena

E-commerce and games in the battle for attention

McKinsey's framing of the "attention equation" describes how value is currently captured in digital markets. According to the equation, it's not just about traffic, but focused, high-intent attention that can be turned into revenues. Several arenas discussed in this section—including e-commerce, video games, digital advertising, and streaming video—are competing for the same scarce, valuable resource: consumer attention. Choosing two examples, e-commerce and gaming show that the competitive challenge is not only to attract attention but to monetize it through engagement, data, and transaction conversion.[1]

E-commerce players are increasingly designing for engagement on their platforms as much as for checkout. Live commerce is on platforms that combine entertainment with instant purchasing in the same closed loop. For example, TikTok advanced this engagement model by launching TikTok Shop with sales-promoting livestreams.[2] Challengers such as Temu compete for loyalty through an incentive-rich, "treasure hunt" user experience. E-commerce platforms are also monetizing attention directly via commerce media networks, an ad ecosystem McKinsey expects to grow by more than 21 percent each year from 2023 to 2027.[3]

Agentic commerce adds a new disruption layer to the attention equation; it can shift value capture from earning attention to winning intent. As AI agents handle discovery, comparison, and checkout, consumers may spend less time browsing feeds and more time delegating high-intent tasks, compressing the path from consideration to purchase and potentially relocating decision moments from marketplaces to agent interfaces. That raises the premium on being agent-readable (clean product data, reliable fulfillment, clear policies) and on employing mechanisms that influence agents' choices (trust, availability, total cost, and verified quality) rather than only maximizing human engagement time.[4]

Video games, which command some of the most focused attention of any medium, show a similar dynamic. Leading game franchises are expanding their brands to generate revenues from subscriptions, virtual goods, and ads as well as media extensions, including films, streaming series, real-world merchandise, events, and theme parks. Commissions for adaptations of game brands into films and series have grown by about 30 percent a year since 2019.[5] For example, after the *Cyberpunk: Edgerunners* anime premiered in 2022, *Cyberpunk 2077* drew roughly one million players a day into the game.[6] *League of Legends* grew beyond its core game to global esports leagues, music releases, and the *Arcane* streaming series. As games' IP creates new revenue streams, managing a franchise across formats—and arenas—opens paths to growth.

[1] Some findings in the economics literature caution that some digital products appear habit-forming and can interact with self-control problems ("digital addiction"), which may have implications for business and beyond. See: Hunt Allcott, Matthew Gentzkow, and Lena Song, "Digital addiction," *American Economic Review*, July 2022, Volume 112, Number 7; Luca Braghieri, Ro'ee Levy, and Alexey Makarin, "Social media and mental health," *American Economic Review*, November 2022, Volume 112, Number 11. DOI: 10.1257/aer.20210867, DOI: 10.1257/aer.20211218

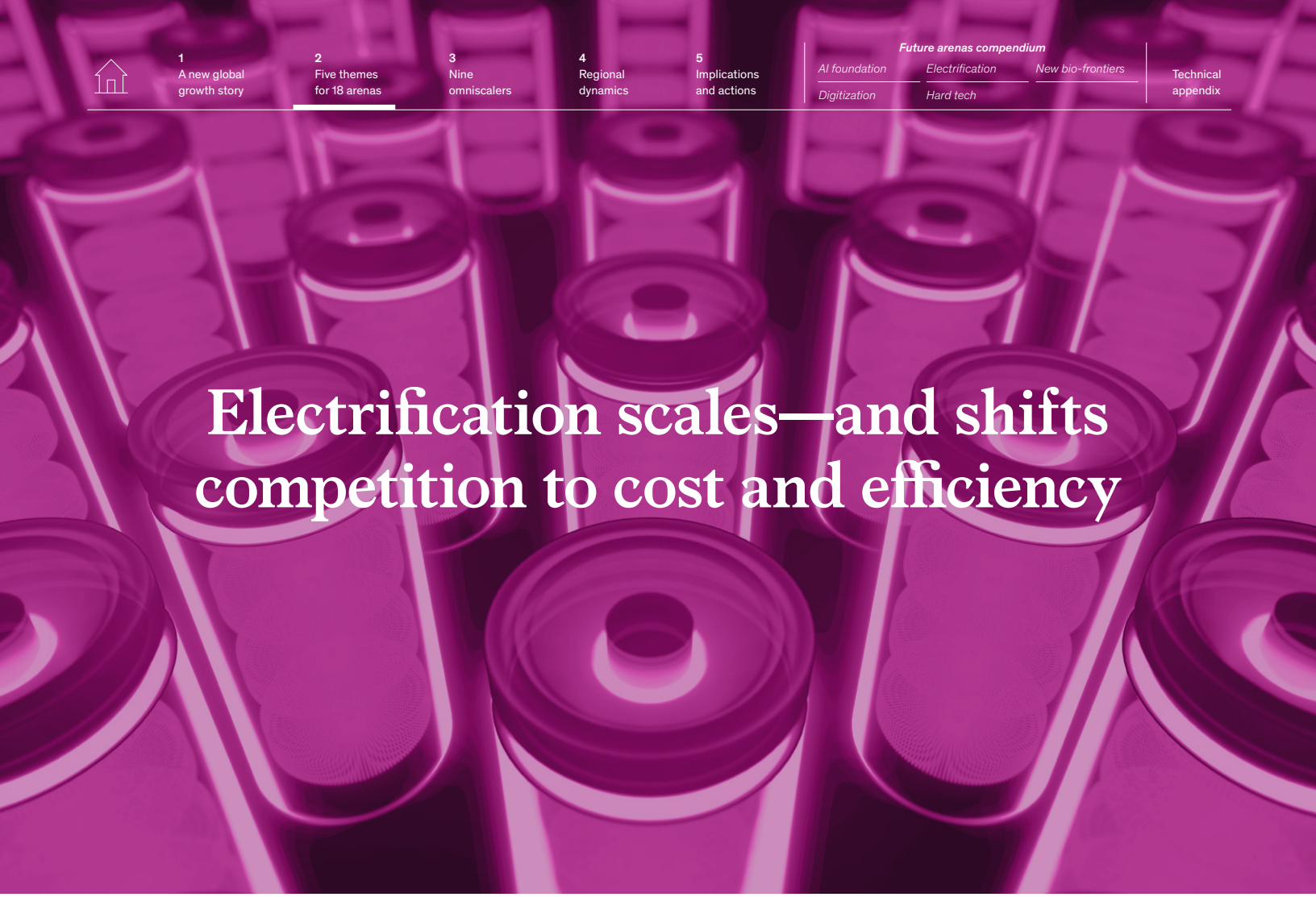
[2] *The State of Fashion 2025: Challenges at every turn*, McKinsey, November 11, 2024; *The State of Fashion 2024: Finding pockets of growth as uncertainty reigns*, November 29, 2025.

[3] Jack Trotter, Marc Brodherson, Quentin George, and Aparna Srinath, "The evolution of commerce media: Navigating a new era in advertising," McKinsey, May 29, 2025.

[4] "The agentic commerce opportunity: How AI agents are ushering in a new era for consumers and merchants," McKinsey, October 17, 2025.

[5] Ronald Santa Cruz, "The game IP goldrush: Numerous standout titles are still up for grabs," Ampere Analysis, January 5, 2026.

[6] Eddie Makuch, "Cyberpunk 2077 reaches 1 million daily players after Edgerunners update and Netflix show premiere," GameSpot, September 21, 2022.



Electrification scales—and shifts competition to cost and efficiency

Electrification

Electrification is the common driver of three future arenas: electric vehicles (EVs), batteries, and nuclear fission. It reflects a broader shift from burning fuels directly—in cars, boilers, furnaces, and industrial processes—to generating, storing, and using electricity instead. As a result, electricity demand is growing faster than total energy supply, a trend further accelerated by AI's growing power needs.[53] Between 2022 and 2024, electricity generation rose about 3.5 percent per year to reach 31,000 terawatt-hours (TWh), almost double the 1.8 percentage points per year growth rate of total primary energy supply over the same period.[54]

Electrification is being pulled forward by two forces: decarbonization goals and the economics of efficiency. Electric end-use technologies, as seen in EVs and heat pumps, are typically much more efficient than fossil-fuel alternatives, like internal combustion engines and gas-burning boilers.[55] Adoption is already meaningful: 22 percent of final energy uses were electric in 2024, and the technical runway remains large. An estimated 75 percent of final energy demand could be electrified with existing technologies, though it may take decades for the hardest of those use cases to become economical.[56]

Demand for electrification is no longer in doubt. As electricity demand grows, players are competing to build capacity at speed, secure supply chains, and sustain attractive returns. We focus on three arenas that illustrate different facets of the larger electrification story. First, EVs are among the largest and fastest-scaling sources of end-use demand.[57] Next, batteries sit at the system's core, enabling both mobility and power flexibility. And finally, nuclear fission can provide the reliable, always-available, low-carbon electricity the growing system increasingly needs.[58]

Electric vehicles stand out among the three arenas for the strength and breadth of arena-creating signals as the industry scales and attention turns to efficiency. Globally, EV revenues grew by 18 percent per year from 2022 to 2025, and unit sales grew even faster. Growth, however, has been uneven, both geographically and across players. China has led the expansion, with EV sales overtaking conventional vehicle sales in mid-2025.[59] Value creation has concentrated in a small set of scaled players; escalatory investment and intense price competition have in fact compressed returns below the cost of capital for all but a handful of participants. These dynamics, along with regional differences in EV adoption and economics, are explored further in chapter 4.

As EV sales have increased and grids have required more energy storage, demand for batteries has surged. Between 2022 and 2025, demand for lithium-ion batteries by volume more than doubled, reaching about 1.6 TWh.[60] Battery energy storage installations alone jumped more than 50 percent globally between 2024 and 2025 to 315 GWh.[61] Falling costs alongside growing power needs, especially from AI and data centers, are reinforcing demand.[62] Yet industry revenues grew only about 3 percent per year from 2022 to 2025 as intense competition, overcapacity, and lower input costs put downward pressure on prices.[63] This dynamic is accelerating consolidation and favoring players with lower production costs, secure access to minerals, and government-backed financing. Such players are often based in China. Smaller or higher-cost entrants are finding it harder to scale efficiently.[64] In the United States and Europe, some policy tools and incentives have been aimed at improving project economics and time to scale, but as conditions change—such as shifts in demand expectations, permitting timelines, financing costs, and eligibility rules—some battery projects have been delayed, downsized, or cancelled.[65]

Meanwhile, nuclear fission is snapping into focus as the way to provide power that is both low-carbon and available 24/7, a capability that is becoming more valuable as power demand rises, more intermittent sources (like solar and wind) are added to grids, and more countries prioritize energy independence. While near-term growth for this industry remains modest, momentum is building in both private and public sectors, supporting expectations for a stronger project pipeline.[66] On the private side, hyperscalers are increasingly turning to nuclear; for example, Meta and Microsoft both signed 20-year power purchase agreements for a fixed-price nuclear power supply.[67] On the public side, the number of national governments endorsing the United Nations COP pledge to triple global nuclear capacity by 2050 increased to 33 in 2025, and the US government has announced broad support for nuclear, too.[68] Despite renewed momentum in the United States as well as in Europe, most nuclear capacity under construction is located outside of these regions.[69] The next phase of competition is likely to be shaped by delivery capability: who can finance, permit, and build reliably at speed—and at a competitive cost. With these market forces, small modular reactors (SMRs) and nuclear microreactors could eventually broaden the field if a small number of designs achieve repeatable licensing and execution (see sidebar “From large builds to SMRs: The new field map of nuclear”).

Beyond EVs, batteries, and nuclear arenas, electrification is catalyzing a broader ecosystem, from charging and grid modernization to advanced materials and power electronics, creating conditions for additional arena formations on the horizon. For example, an electric tech stack that spans batteries, electric motors, and power electronics increasingly underpins physical innovations across our hard tech theme—robotics, autonomous vehicles, drones, rockets, and more.[70]

Arenas in the hard tech theme share a common trait: They translate advances in engineered hardware—often paired with software and AI—into new physical-world capabilities. In this report, we focus on five such arenas: robotics, shared autonomous vehicles (SAVs), future air mobility (including both electric vertical takeoff and landing vehicles, known as eVTOLs, and commercial drones), modular construction, and space. Together, they span how we build, move, and operate in challenging environments, from factory floors and city streets to the upper atmosphere and orbit. While many of these arenas benefit from electrification, we treat them separately because their primary drivers of value are the deployment of novel physical systems and autonomy at scale, often in combination.

Inside the arena

From large builds to SMRs: The new field map of nuclear

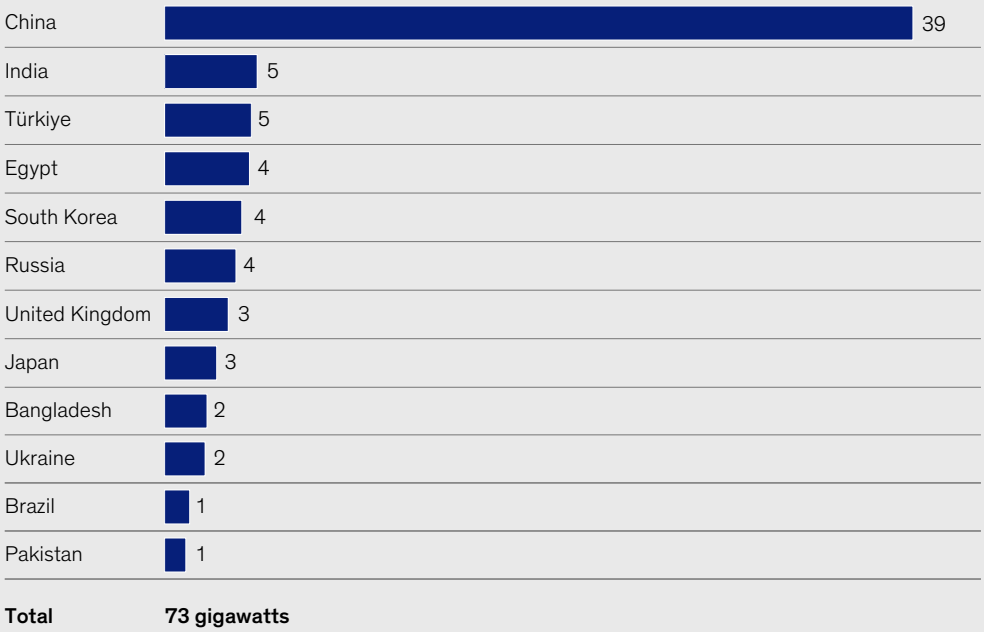
Although nuclear capacity additions were limited from 2022 to 2025, the global pipeline is accelerating, with China at the forefront.[1] Between 2022 and 2025, 36 reactors started construction, 25 of them in China.[2] That was roughly a third more than the number of reactors starting construction a decade ago.[3] By the end of 2025, about 70 reactors were under construction, projects that could bring more than 70 gigawatts online, with more than half in China (Exhibit).[4]

Recent momentum reflects the fact that countries such as China, South Korea and the United Arab Emirates have brought together state-backed financing and standardized reactor designs with aligned public–private execution models that reduce cost and delivery risk. These countries demonstrated materially faster and cheaper build times—often five to seven years, compared with about ten years or more in Europe and the United States.[5]

Exhibit

Half of nuclear capacity under construction is in China.

Nuclear power capacity under construction by country as of December 2025, GW[1]



Total **73 gigawatts**

[1]Countries with less than 1 GW of capacity under construction are excluded. This includes countries pursuing small modular reactors (SMRs), such as Argentina, the United States, and Canada.
Source: World Nuclear Association; McKinsey Global Institute analysis

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1 From 2022 to 2025, about 10 gigawatts were added globally, an increase of about 2 percent in global nuclear capacity, bringing the global total up to about 420 to 425 GW by end of 2025. "Trend reports: Nuclear power capacity," Power Reactor Information System, International Atomic Energy Agency, accessed February 20, 2026.
2 "Reactor database," World Nuclear Association, accessed February 24, 2026.
3 Mycle Schneider and Antony Froggatt, *World nuclear industry status report 2016: Summary and conclusions*, World Nuclear Industry Status Report, July 2016; Mycle Schneider and Antony Froggatt, "WNISR 2015: Executive summary and conclusions," in *World Nuclear Industry Status Report 2015*, World Nuclear Industry Status Report, July 28, 2015; Mycle Schneider and Antony Froggatt, "Executive summary & conclusions," in *World Nuclear Industry Status Report 2013*, World Nuclear Industry Status Report, July 11, 2013.
4 "Reactor database," World Nuclear Association, accessed February 24, 2026.
5 China's average construction time per project is seven years (for projects that came online between 2017 and 2023, including several first-of-a-kind designs), with several completed in five years. Reactors in South Korea and the United Arab Emirates also came online in about seven years. Recent nuclear projects in the United States and the European Union (such as Vogtle Units 3 and 4 in the United States and Flamanville 3 in France) have experienced major cost overruns, with final capital costs reaching roughly two to four times the original estimates. These increases are closely linked to delays in construction schedules. See "The path to a new era for nuclear energy," International Energy Agency, January 2025.

Inside the arena (continued)

From large builds to SMRs: The new field map of nuclear

Technological innovation in nuclear builds could, however, reopen the field to new entrants. In particular, advances in repeatable small modular reactor (SMR) designs that typically generate from 50 MW to 300 MW could speed construction timelines and reduce costs, even if smaller projects don't enjoy the full economies of scale of large reactors that usually generate 1 GW or more.[6] Several SMR designs are currently in early stages or under construction in Canada, the United States, China, and Russia.[7] Most SMR designs under active development are being pursued in North America, followed by the European Union, with large SMR fundraising rounds heavily concentrated in the United States. As of early 2025, about $15 billion was secured for SMRs development and deployment—with around 35 percent of that coming from the private sector.[8] Research is advancing on even smaller nuclear microreactors that generate up to 20 MW. Their compact size could allow them to be fully built in a factory and then transported easily, potentially even moving from site to site. In the United States, a May 2025 executive order aimed to expedite the regulatory approval process for SMRs and microreactors.[9] Nonetheless, only a handful of SMR design projects have reached licensing. And while investments in SMRs are growing, they remain a small fraction of global investments in nuclear energy.[10]

6 "The Path to a New Era for Nuclear Energy," International Energy Agency (IEA), January 2025.
7 "Small modular reactor (SMR) global project tracker," World Nuclear Association, updated February 16, 2026; "Kairos Power begins construction on Hermes Low-Power Demonstration Reactor," Kairos Power, July 30, 2024; "Darlington SMR," Ontario Power Generation, accessed February 24, 2026; Mycle Schneider et al., *World nuclear industry status report 2025*, World Nuclear Industry Status Report, September 22, 2025; "The NEA small modular reactor dashboard: Third edition," OECD Nuclear Energy Agency, 2025.
8 "The NEA small modular reactor dashboard: Third edition," OECD Nuclear Energy Agency, 2025.
9 "Ordering the reform of the Nuclear Regulatory Commission," Executive Order 14300 of May 23, 2025, Federal Register, May 29, 2025.
10 Global investment in nuclear was about $70 billion in 2025. See *World energy investment 2025*, International Energy Agency, June 2025.

Hard tech is poised to take off

Hard tech

Hard tech arenas are likely to change the way we experience the world. Modular construction can compress build timelines.[71] Advances in robotics enable machines to expand from manufacturing to new fields like healthcare and agriculture. Autonomous vehicles, drones, and eVTOLs could reshape passenger mobility, delivery, and other sectors. Meanwhile, space innovation opens new horizons. Across all hard tech arenas, AI is accelerating automation and improving performance.

On the technology side, we see a convergence of three arenas in particular—robotics, SAVs, and future air mobility. In all three, advances in machine sensors, AI-based perception and decision-making, and increasingly capable actuators are allowing machines to perceive their surroundings, reason in real time, and act autonomously in the physical world.[72] Progress in one arena is increasingly transferable to others. For example, advances in urban driving perception can lead to advances in delivery drones and warehouse robots, reinforcing innovation across the broader hard tech ecosystem.

Over the past three years, technology has advanced, investment has scaled, and demand has risen. Yet most hard tech arenas remain early stage, albeit to different degrees. Some are experiencing a renaissance as new use cases and enabling technologies emerge. For example, space, long anchored by government and telecoms, is being reshaped by new private players that are reducing launch costs and enabling new commercial services. Likewise, robotics, for decades deployed in closed-off industrial settings like assembly lines, is advancing more general-purpose applications as AI-based control improves. Robotaxis (that is, SAVs), while still relatively young, are beginning to scale in multiple cities.

Others remain in earlier stages of development: eVTOLs are progressing from certification to commercialization, drone delivery is starting to scale in select corridors, and modular construction remains a relatively slim share of global construction market. But across the set, the question is often shifting from "does it work?" to "can it scale?"—with integration into real-world operations, regulations, and economics becoming decisive. The examples below illustrate that dynamic.

Driverless robotaxis are a reality on the roads in some markets. SAVs moved beyond pilots and now provide transportation for millions of people. They are commercially operating or testing in about 30 cities in the United States, China, and the United Arab Emirates.[73] In California alone, miles traveled by robotaxis between September 2024 and September 2025 tripled, reaching almost 13 million miles (as shown in Exhibit 11).[74] The two leading players, Waymo and Apollo Go, delivered more than 37 million rides from launch to 2025.[75] Alphabet's Waymo increased weekly rides by a factor of 25 in just two years.[76] This momentum is expected to continue as safety and user acceptance improve and as capital keeps flowing.[77] In 2024, Waymo raised an additional $5.6 billion to fund expansion, and UK-based startup Wayve raised about $1 billion.[78]

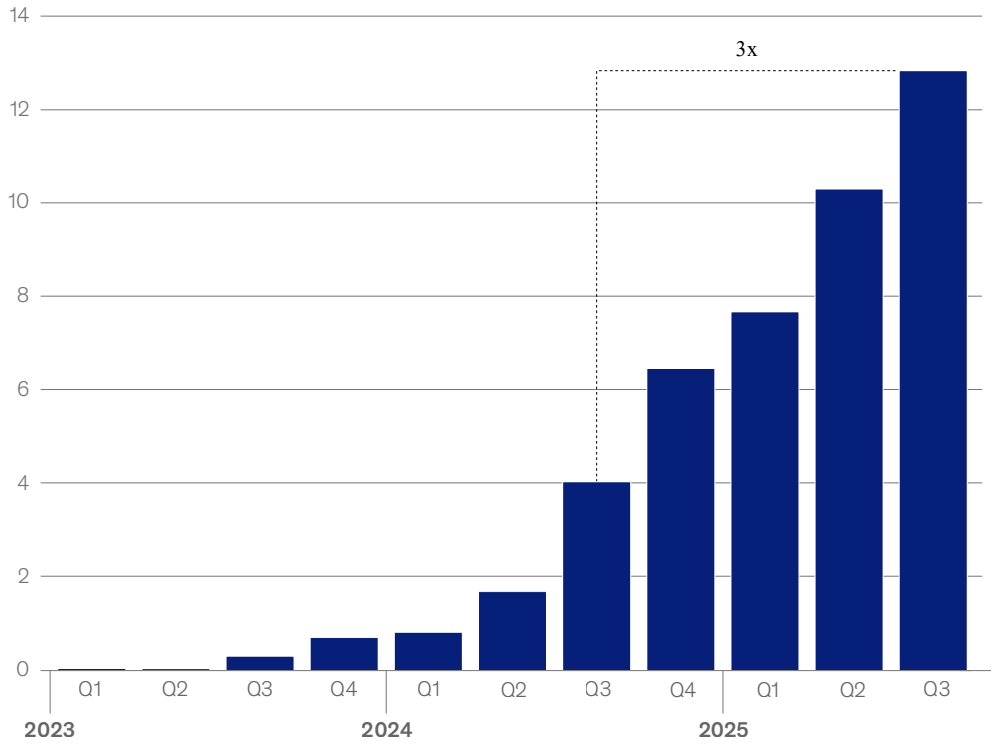
Even as SAVs and investment scale, the economics remain challenging. As of 2025, leading players are still losing money, and Apollo Go has reportedly reached unit-level profitability in only one city (Wuhan, China).[79] Our estimates show that robotaxi cost per vehicle mile traveled could decrease by more than 80 percent when operating at scale.[80] As the industry grows, operators are pushing costs down through AI-enabled performance gains, lower-cost hardware, and more efficient operations and fleet utilization.[81] Yet the pace of that expansion relies on complex and fragmented permitting requirements, particularly in the United States and the European Union.[82]

In another industry that once seemed more science fiction than next door, commercial delivery drones are seeing strong momentum.[83] The number of drone deliveries rose by more than 25 percent from 2022 to 2023.[84] Zipline, one of the arena's leading players, doubled its deliveries from one million in April 2024 to two million by January 2026.[85] The primary drivers of growth were quick-commerce package delivery and time-sensitive medical deliveries, with growing markets in the United States and Africa.[86] Demand also increased in agricultural uses; in the United States, the number of registered agricultural drones increased more than fivefold in 18 months.[87] Beyond commercial applications, defense drones are also growing on renewed investment; while we do not size military applications in our market scenarios, we discuss this trend below.

Exhibit 11

Miles traveled by robotaxis in California tripled in just one year.

Passenger miles traveled per quarter by California's driverless taxis, million



Source: California Public Utilities Commission (2025); McKinsey Global Institute analysis

McKinsey & Company

Although the drone market is growing, it remains nascent, and its economics remain challenging. Limited approvals to run uncrewed beyond-visual-line-of-sight (BVLOS) flights is another constraint. While some BVLOS flights are possible today, they often rely on waivers and risk mitigation, including human observers and other oversight efforts, which add labor costs and confine operations to small geographies.[88] Clearer, scalable BVLOS rules would enable longer routes and hub-and-spoke networks, improving the business case for delivery and other applications.[89] In the United States, proposals to ease regulation are underway.[90]

Also within future air mobility, eVTOLs are even more nascent. There are indications that they are approaching operating approvals, but commercialization is still in the distance (see sidebar "Hover, transition, certify: What still stands between eVTOLs and scale").

These examples highlight a common pattern in hard tech: Most arenas show strong progress on potion elements (technological progress, investment, and market expansion) but are only beginning the journey to commercial scale. The pace of pickup will hinge on how the potion elements evolve. New demand drivers could emerge. AI expansion could propel modular construction for data centers; defense needs could expand (see sidebar "How defense is driving demand across hard tech").[91] Regulation will also be decisive. Clearer rules and faster permitting can unlock deployment, and targeted public support can galvanize private investment.[92]

Biotechnology is entering a new era. New tools to read, write, and edit biological elements are expanding what can be designed and built with living systems. More precise gene editing is enabling resilient crops. Microbes can now act as miniature factories to produce biomaterials, such as renewable and lower-carbon plastics known as bioplastics. Biotechnology is accelerating medical research, from novel weight-loss treatments to gene and cell therapies.

Two arenas capture much of this frontier activity: drugs for obesity (and related conditions) and non-medical biotechnology, the latter of which spans alternative proteins, agricultural biotechnology, consumer products and services, and biomaterials and biochemicals. While innovation advances across both, the two arenas are moving at uneven paces.[93]

Inside the arena

Hover, transition, certify: What still stands between eVTOLs and scale

Stuck in downtown traffic, racing to reach a destination on time, the appeal of a flying taxi is obvious. The good news is that commercialization of electric vertical takeoff and landing vehicles (eVTOLs) appears to be on the horizon. These vehicles could serve dense, congested urban and regional routes, such as city commutes and city-to-airport links. Compared with traditional helicopters, eVTOLs have the potential to offer lower operating costs (energy and maintenance), simplify operations and training, and improve safety through multi-rotor redundancy. [1]

There is growing evidence that eVTOLs can integrate into existing aviation systems. EHang in China moved beyond demonstrations toward regulator-governed passenger operations, while Joby in the United States has progressed with production-intent aircraft that conform with government requirements.[2] Deployment plans are also emerging for select spots in the Middle East as well as other cities and airports, though many lack confirmed launch timelines.[3]

By and large, the sector is transitioning from head-turning demos to the hardest parts of aviation: proving repeatable safety, earning certification, scaling day-to-day operations—and, ultimately, earning sustainable profits.

Technology remains a barrier even as performance improves. Lighter airframes and better propulsion systems extend flight ranges and reliability. At the same time, battery technologies, while improving, can still be a make-or-break factor. If battery packs cost too much or degrade too soon, operating costs rise quickly, weakening unit economics. In addition to battery costs, the total aircraft costs must be factored in to determine sufficient ride volumes and utilization rates that work economically for a broader rollout.[4] If each flight costs too much, the commercial appeal dwindles.

While most companies are still working toward certification of their first-generation aircraft, some are already designing the next wave: cargo variants, longer-range configurations, and hybrid concepts. These innovations reflect both strong momentum in the arena and a practical push to improve range, payload, and operating economics (especially where battery performance and degradation remain limiting factors).

All that said, regulations may still be heavy burdens for eVTOLs. Certification and operating approvals require extensive proof (for safety, redundancy, and pilot training) and typically involve long test campaigns. Delays are common in aircraft certification, and they may persist here. To date, only one player, eHang in China, has secured the approval needed for a remotely piloted, human-carrying eVTOL. Meanwhile, most eVTOL concepts being tested still assume a pilot onboard, which puts pressure on unit economics as they lose a passenger seat and pay human wages.[5] But if the first pilotless eVTOL takes off, the model well may, too.

[1] It is important to note that eVTOL designs are pursuing different range and mission profiles. Distributed-propeller architectures tend to target shorter intracity routes, while lift-and-cruise or wing-borne configurations enable longer ranges. Commercialization of designs will likely progress by use case rather than as a single market. See Paul Marks, "eVTOL: Making the electric dream a safe one," Aerospace America, August 24, 2021; Shazan Siddiqi, "Vertical ventures: Understanding eVTOL operations," IDTechEx, June 27, 2024; Johnny T. Doo et al., *NASA electric vertical takeoff and landing (eVTOL) aircraft technology for public services—a white paper*, NASA Transformative Vertical Flight Working Group 4 (TVF4), August 2021.

[2] "EHang EH216-S interpretation series: Air operator certificate," EHang, March 28, 2025; "Joby begins power-on testing of first conforming aircraft, enters final stage of type certification process," Joby Aviation, November 5, 2025.

[3] For example, Joby in Dubai and fellow US start-up Archer Aviation in Abu Dhabi. Andrew J. Hawkins, "Joby delivers first aircraft to Dubai as air taxi service nears launch," *The Verge*, June 30, 2025; "Archer Begins Test Flights in Abu Dhabi," Archer, July 2, 2025.

[4] "A roadmap for eVTOL success," *Airspace Magazine*, CANSO, 2025, Number 65.

[5] "Test certificate" does not include operational authorization for commercial services at approved sites. See "China's flying car start-ups take their case to the skies," *Financial Times*, September 17, 2025; "China's flying taxi leader aims to launch airport services within 3 years," *Financial Times*, November 5, 2025; "EHang's EH216-S eVTOL operators obtain air operator certificates," EHang, March 30, 2025.

Inside the arena

How defense is driving demand across hard tech

Defense is growing in importance in the current geopolitical landscape. Europe is ramping up rearmament and industrial capacity (including EU plans such as Readiness 2030 and the proposed SAFE financing tool), and global military spending has reached record levels. This upshift provides incentives for innovation and for scale into space, drones, and modular construction.[1]

In space, security priorities emphasize resilient satellite constellations, secure communications, and rapid-response capabilities. The United States, for instance, has proposed a "Golden Dome" missile-defense effort that would combine sensor networks (including satellites) with interceptors and battle-management software. The US government estimated spending $175 billion, with a number of space and defense companies bidding for related contracts.[2]

In drones, defense demand now spans very different classes of systems, from large, high-end military unmanned aerial vehicles for long-range surveillance to small tactical drones used in high volumes for scouting and strike. Many of the latter are "attritable," meaning they are designed to be replaceable in contested environments. Meanwhile, spending on counter-drone defenses is also rising and stoking demand.[3] For instance, the Replicator and the Drone Dominance initiatives in the United States are working with companies to deliver thousands of these systems on an accelerated timeline.[4] In 2025, the European Commission unveiled its *Defence Readiness Roadmap 2030*, which makes drones a flagship priority and envisions a "Drone Wall."[5]

Defense demand could also accelerate modular construction, because modular facilities and protection systems can be built more quickly than current systems, moved, and reused. In the United States, policy covers relocatable facilities for deployments and contingencies, and the US Army Corps of Engineers has advanced modular protection concepts (such as overhead cover) designed for rapid fabrication and deployment. [6]

An upshift in defense spending provides incentives for innovation and for scale into space, drones, and modular construction.

[1] Sebastian Clapp et al., ReArm Europe Plan/Readiness 2030, EPRS | European Parliamentary Research Service, European Parliament, April 2025; "Unprecedented rise in global military expenditure as European and Middle East spending surges," Stockholm International Peace Research Institute (SIPRI) press release, April 28, 2025.
[2] Mike Stone and Doina Chiacu, "Trump to make Golden Dome announcement on Tuesday, US official says," Reuters, May 20, 2025; Hannah D. Dennis, "Defense primer: The Golden Dome for America," Congressional Research Service In Focus, IF13115, September 29, 2025.
[3] Low-cost, replaceable units are increasingly known as "attritable" drones for their ability to withstand attrition.
[4] "The Replicator initiative," Defense Innovation Unit, accessed February 23, 2026; "Unleashing American drone dominance," White House presidential action, June 6, 2025.
[5] Wouter Remmen and Antonio Marco D'Errico, "European drone investments: Mapping the value chain," Rabobank RaboResearch, January 23, 2026.
[6] "Relocatable facilities," Instruction 4165.56, US Department of Defense, June 23, 2022.

Along new bio-frontiers, non-medical biotech remains nascent while obesity drugs ramp up

New bio-frontiers

Non-medical biotech is progressing more gradually in an array of industrial and consumer segments, especially in alternative proteins (including lab-grown meat and precision fermentation) and advances in agricultural biotechnology (for instance, using CRISPR gene editing to modify crops). Several industrial biotech segments remain in the earlier stages in commercialization and are dependent on end-markets economics. For instance, slower growth and margin pressure in agriculture is delaying the adoption of new biotech seeds, despite strong scientific progress. Still, underlying demand drivers support long-term potential, even if near-term commercialization is uneven.

By contrast, obesity drugs are scaling rapidly and exhibit many of the characteristics of a full-fledged arena. From 2022 to 2025, the market expanded significantly; revenues increased by more than 30 percent per year following a surge in demand.[94] In the United States, GLP-1 prescriptions are now more than six out of every 100 prescriptions, a number that increased sixfold over the past five years.[95] In several European countries, the out-of-pocket market roughly doubled over a single year.[96] While the market remains concentrated, led by Novo Nordisk and Eli Lilly, competitive intensity is rising, with more than 80 companies pursuing obesity treatments in 2025.[97] Many competitors, including Boehringer Ingelheim, Amgen, AstraZeneca, and Roche, have late-stage obesity programs or assets.[98] Entrants are also investing via M&A and differentiated technologies. For instance, Pfizer acquired GLP-1 producer Metsera for about $10 billion in 2025.[99]

Demand could increase as penetration remains low and access expands. As of 2024, only about 3 percent of US adults deemed eligible had received a prescription for weight-loss medications, and affordability remains a barrier because payer coverage is limited in markets such as the United States and the United Kingdom.[100] At the same time, prices have dropped in recent years (by 25 to 40 percent in the United States), and upcoming key patent expirations could bring lower-cost generics and expand access.[101]

Competition is further reshaping how novel weight-loss therapies reach patients. Companies are developing oral alternatives to injections and longer-acting regimens to cut dosing frequency and improve persistence.[102] Incumbents are also testing new commercial models to capture the growing out-of-pocket market. Novo Nordisk and Lilly have launched direct-to-consumer platforms, NovoCare and LillyDirect, offering telehealth and home delivery.[103] These new channels are already meaningful for sales. For Lilly, about 35 percent of Zepbound prescriptions in the second quarter of 2025 were filled through LillyDirect.[104] Moreover, both Novo Nordisk and Lilly introduced substantial discounts for patients paying out of pocket in 2025.[105]

The growth of novel weight-loss therapies could reshape more than pharmaceutical sales, especially if consumer-oriented care models and their spillovers, spread into adjacent parts of the healthcare system (see sidebar “Obesity drugs could trigger a more expansive health reset”). These types of therapies also reflect a broader shift within biotech. As scientific capabilities advance, innovation is increasingly focused not only on treating acute disease but also on addressing metabolic health and other chronic conditions that shape long-term outcomes. One area of development is “healthspan” research, which seeks to better understand and influence the biological processes associated with aging. This field remains emerging and faces scientific, regulatory, and commercial hurdles, but it illustrates how biotech priorities are expanding alongside advances in data, biology, and therapeutic platforms. Together, these developments highlight the evolving scope of the biotech landscape.[106]

Inside the arena

Obesity drugs could trigger a more expansive health reset

Nearly one in eight people around the world is living with obesity, one of the largest human-made epidemics in history and a major risk factor for multiple diseases.[1]

As the McKinsey Health Institute points out in the 2025 report *The path toward a metabolic health revolution*, the rise of novel weight-loss therapies is reframing obesity from "intractable" to "treatable." And in doing so, it is reframing a wider spectrum of choices. For instance, should drugs be scaled to manage today's obesity, or should this moment be used to drive a broader metabolic-health push centered on prevention and societal change? The latter implies shifting from reactive treatment to prevention on three levels—preventing onset, preventing progression, and preventing complications—supported by clinician training and system-level changes in how metabolic health is addressed. In this scenario, novel weight-loss therapies become a health tool, akin to sunscreen for burn prevention or supplements to ward off vitamin deficiencies. The preventive path may be harder, because it crosses more sectors, but the upsides should be much greater, too.

In health systems, the rise of these therapies is already reshaping economics and care delivery for manufacturers, providers, and payers. Early signs of consumerization are emerging, with demand becoming more consumer-led through direct-to-consumer-style marketing and distributor-led channels. In the United States, reseller models are allowing platforms and clinics to market and distribute these drugs without manufacturing them, alongside growth in telehealth and specialized clinics to meet demand.

As access broadens and use scales through these new channels, the effects are likely to extend beyond healthcare delivery and pharma, inspiring investment and innovation across industries. Broader adoption could reshape nutrition and the food industry, pushing consumer packaged goods companies to rethink products as eating patterns change (influencing protein content and calorie totals, for example). It could also have an impact on the fitness and sports ecosystem, as rapid weight loss increases the focus on exercise and muscle preservation.[2]

The intersection of these trends—widespread consumer demand, new care models that broaden access, and a growing ecosystem of supporting services—could improve health outcomes and unlock billions of dollars of spend on drugs, care, delivery, and adjacent markets such as food, fitness, and health. Catalyzing metabolic health could be achieved with coordinated cross-sector leadership focused on the same broad set of outcomes.[3] How far might such a metabolic health movement go? Consumer preferences, social norms, regulations, and scientific evidence will all be factors to amplify or rein in this arena looking forward.

[1] *World Obesity Atlas 2025*, World Obesity Federation, March 2025.
[2] Anas El Turabi, Drew Ungerman, Hemant Ahlawat, and Lars Hartenstein, *The path toward a metabolic health revolution*, McKinsey Health Institute, May 20, 2025. https://www.mckinsey.com/mhi/our-insights/the-path-toward-a-metabolic-health-revolution
[3] See *Catalysing cross-sector leadership for metabolic health: Why metabolic health matters and why now is the time to act*, World Economic Forum, January 2026.


GEAR

CHAPTER THREE

Omniscalers are escalating competition across arenas

The previous chapter outlined the rapid scale of investment and pace of change that is shaping the arenas. A natural next question is *who* is driving it. Certainly the hyperscalers are in the mix, and we can see the rapid escalation of spend and competition. A related dynamic we explore in this chapter is "omniscalers."

Omniscalers are a group of nine companies that are not only among the world's biggest investors but are also playing simultaneously across multiple arenas.[107] We are perhaps used to Amazon being both the world's biggest e-commerce company and the leader in cloud. But the Tesla-plus-SpaceX ecosystem now spans AI, digital media, robotics, EVs and space—almost systematically ticking the boxes of the new arenas. These two omniscalers are joined by Alibaba, Alphabet, Apple, Huawei, Meta, Microsoft, and Samsung.[108] Six of them are based in the United States, and the other three in Asia. We explain how we picked this set of companies in the next section of this chapter.

The emergence of omniscalers signals a new kind of economy of scope and scale. Omniscalers can certainly resemble conglomerates, deploying capital across diverse businesses. They differ, however, in how they scale and in the capabilities they carry across arenas.[109] Omniscalers can deploy large pools of cash into long-payback bets. Equally importantly, they benefit from data and platform network effects, where large user bases generate data that improves products, attracting more users and partners. Today's omniscalers can also reuse infrastructure across arenas, such as cloud and compute, and even logistics networks, so new businesses start with built-in capabilities and distribution. That lowers the marginal cost of expansion. Incremental capital often builds on existing platforms instead of starting from scratch, matching the escalatory logic of arena competition. Omniscalers integrate these advantages and capabilities, even across arenas, through sustained R&D, capital expenditures, and M&A.

As they scale, omniscalers can blur arena boundaries, influence investment-intensity levels, and disrupt value-chain structures. At the same time, scale alone is neither necessary nor sufficient for success in arenas. Many large companies do not scale across arenas, while at the same time we see new entrants continue to gain traction. Recent examples include well-funded younger AI players such as Anthropic and Perplexity; humanoid-robotics entrants such as Figure; fast-scaling EV challengers such as Zeekr (later acquired by Geely); and space players such as Rocket Lab.[110] As escalatory investments reach new heights in arenas with omniscalers, competition isn't quelled; it's changing.

In this chapter, we examine how omniscalers compete across arenas and what enables their expansion. This section describes the phenomenon rather than endorsing it. Being an omniscaler is inherently neither good nor bad, and many companies have created value through other paths.

Nine omniscalers now span many arenas—and often lead them

We analyze nine omniscalers, though there may be more.[111] The omni-9 are Alibaba, Alphabet, Amazon, Apple, Huawei, Meta, Microsoft, Samsung, and Tesla. Within this group, two operate as broader ecosystems or clusters of companies in which formally separate entities share leadership, capital, and capabilities. They are the cluster of companies founded by Elon Musk (Tesla and SpaceX, including xAI) and Jeff Bezos (Amazon, Blue Origin, and Project Prometheus).[112]

We defined omniscalers based on two simple criteria: they ranked among the top 30 global spenders on combined R&D and capital expenditures in 2024, and they actively compete—meaning they generate publicly reported revenues—in at least three future arenas.[113] These criteria offer the benefit of simplicity, although we acknowledge there are challenges in the measurement itself. For one thing, arena participation can take many forms, not always generating revenue directly. For example, Apple is in chip design for its own internal use.[114] Alphabet has invested in a long-duration energy storage company to accelerate progress in batteries.[115] In Exhibit 12, we track such investment and projects in light blue, but our omniscaler definition is based on publicly reported revenue generation in at least three future arenas (as shown in darker blue).

The spending and earning criteria exclude several adjacent players for now, including both large spenders and multi-industry leaders. Some companies meet the spending threshold but remain focused outside arenas; one example is Toyota Motor (more than $30 billion in capital expenditures) in traditional automotive.[116] Others meet the threshold but are concentrated in a single future arena, such as TSMC in semiconductors. Some are investing at scale in arenas close to their core business, like Walmart's substantial growth in e-commerce and digital advertising, and may enter the omniscaler list as they expand into other areas.[117] Conversely, companies such as Tencent and Uber span multiple arenas but fall below the top-spender bar, and Nvidia—despite leading semiconductors and playing in several arenas—remains relatively capital-light and also falls below the investment cutoff.[118] Finally, inclusion depends on consistent public reporting. ByteDance may be a tenth candidate based on reported investment and multi-arena activity, but it remains outside the core list in the absence of comparable financial disclosures.

Omniscalers share a few common characteristics. First, their scope is wide. While our threshold was revenue generation in three arenas, by 2025, the average omniscaler participated in closer to six arenas. Alphabet reached nine.

Second, their depth can be substantial. Omniscalers account for a majority of revenue in cloud services, AI software and services, and digital advertising, for example. In each of these arenas, six or more omniscalers generate revenues.[119] Yet they are more commonly new entrants in the other 15 arenas, where more focused players still hold sway. For instance, omniscalers hold just a small portion of global revenues in arenas like semiconductors, video games, and robotics, despite significant activity by them.

Third, the landscape is highly dynamic. Some arenas have become markedly more crowded in recent years, as seen in robotaxis—with Tesla and Amazon-owned Zoox intensifying competition with Alphabet-backed Waymo, the early leader (together with Baidu's Apollo-Go).[120] A comparable map in 2010 (Exhibit 12) shows a narrower scope and reflects more tentative cross-arena moves.

Seen over the years, their expansions almost look like convergence. For most omniscalers, a strong core business became a launchpad for cross-arena growth. Some started as digital natives, others from device- or hardware-led roots. Yet today, there is considerable overlap across digitization platforms and the AI foundation. Amazon and Alibaba moved from e-commerce into cloud and advertising. Microsoft expanded from software into gaming and cloud. Samsung is an established player in semiconductor value chains, while others developed proprietary chips or deep foundry partnerships. In recent years, all nine have made sustained, large-scale bets in AI.

Exhibit 12

Omniscalers span multiple future arenas.

Omniscalers' presence in future arenas in 2025[1]

Largest business[2] | Revenue-earning business | Pre-revenue, internal production, or equity investments[3] | N/A

FUTURE ARENAS	Alphabet	Amazon cluster[4]	Microsoft	Tesla/X cluster[5]	Meta	Apple	Samsung	Alibaba	Huawei[6]	*Revenue share, %*
	◂ US						Non-US ▸			
Semiconductors	■	■	■	■	■	■	■	■	■	5
Cloud services	■	■	■				■	■	■	70
AI software and services	■	■	■	■	■	■	■	■	■	55
E-commerce		■			■			■		45
Digital advertising	■	■	■	■	■	■	■	■		65
Video games	■	■	■		■	■	■	■		15
Streaming video	■	■				■	■	■		30
Cybersecurity	■	■	■		■	■	■	■	■	20
Electric vehicles		■		■				■	■	20
Batteries	■	■		■			■			10
Nuclear fission		■					■			<1
Space	■	■	■	■						15
Robotics	■	■	■	■	■		■	■	■	<5
Shared autonomous vehicles	■	■	■	■						95
Future air mobility	■	■								<1
Modular construction							■			<1
Obesity drugs										
Non-medical biotech	■									
Total in future arenas										
Number of arenas	9	8	5	5	4	3	7	5	5	
Revenue, $ billion	380	720	150	110	200	25	75	130	10	
Revenue share, %	95	100	50	100	100	5	20	90	10	
Company capital expenditures and R&D spend, $ billion	150	240	100	20	130	50	70	25	25	

Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Disclaimer: Arena-level data may be incomplete (some revenues aren't reported, and some initiatives aren't public or were canceled), so counts may be understated. All data is rounded.
[1]Omniscalers were top 30 spenders by R&D and capital expenditures in 2024 and earned revenues in at least three future arenas in 2024.
[2]Most yearly revenues are generated in the arena (>50%). Some companies do not have core businesses in arenas of the future, with most revenues coming from other markets (arenas of the past or non-arenas).
[3]Reporting of pre-revenues businesses, internal production activities, or equity investments may be nonexhaustive as these activities may be unreported.
[4]Including Amazon, Blue Origin, Prometheus.
[5]Including Tesla, SpaceX.
[6]Huawei's 2025 R&D spending is assumed to be the same as in 2024 as data has not yet been disclosed.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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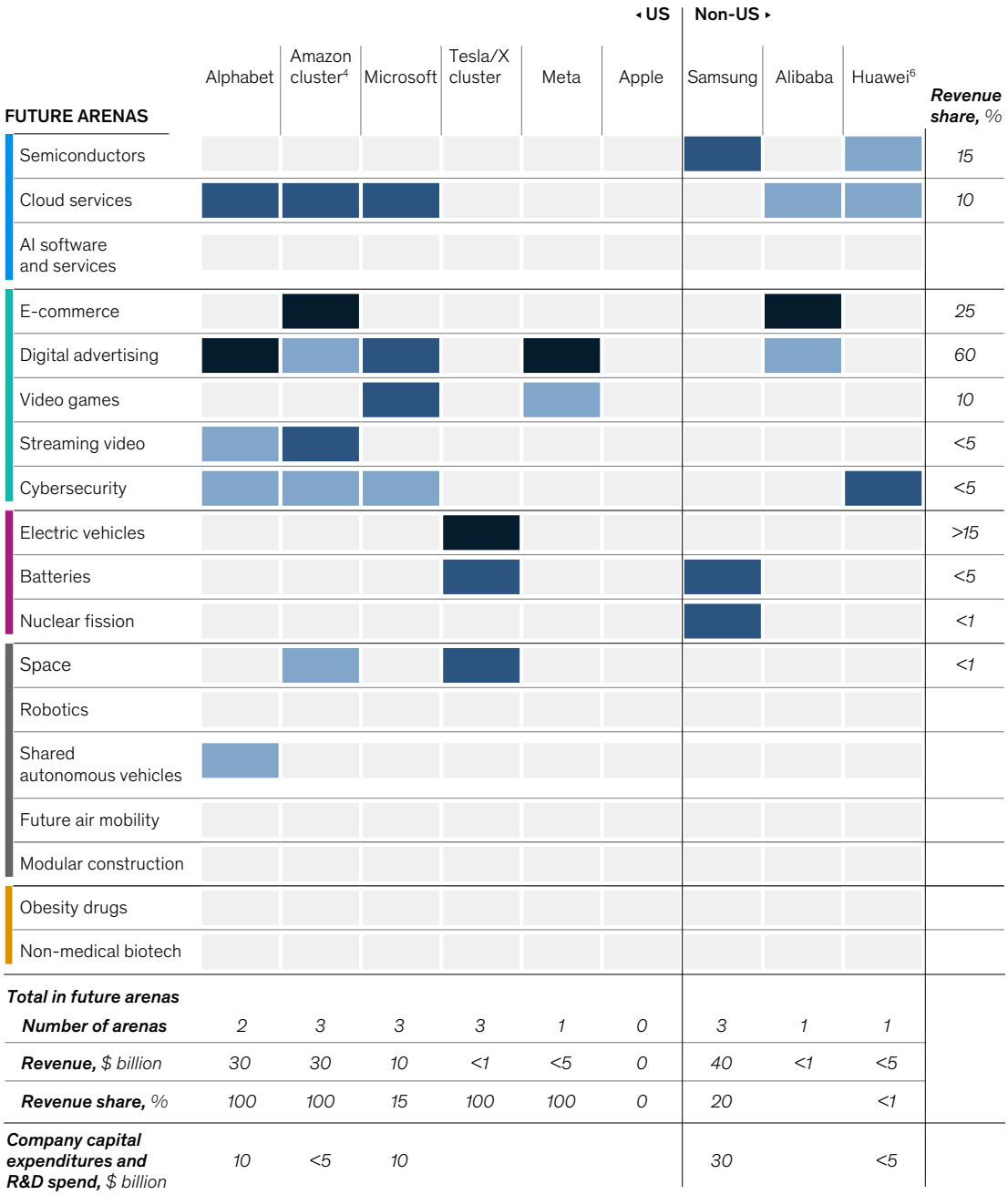
Exhibit 12 (continued)

Omniscalers span multiple future arenas.

Omniscalers' presence in future arenas in 2010[1]

Largest business[2] | Revenue-earning business | Pre-revenue, internal production, or equity investments[3] | N/A



	Alphabet	Amazon cluster[4]	Microsoft	Tesla/X cluster	Meta	Apple	Samsung	Alibaba	Huawei[6]
Total in future arenas									
Number of arenas	2	3	3	3	1	0	3	1	1
Revenue, *$ billion*	30	30	10	<1	<5	0	40	<1	<5
Revenue share, *%*	100	100	15	100	100	0	20		<1
Company capital expenditures and R&D spend, *$ billion*	10	<5	10				30		<5

Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Disclaimer: Arena-level data may be incomplete (some revenues aren't reported, and some initiatives aren't public or were canceled), so counts may be understated. All data is rounded.
[1]Omniscalers were top 30 spenders by R&D and capital expenditures in 2024 and earned revenues in at least three future arenas in 2024.
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[4]Including Amazon, Blue Origin, Prometheus.
[5]Including Tesla, SpaceX.
[6]Huawei's 2025 R&D spending is assumed to be the same as in 2024 as data has not yet been disclosed.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

McKinsey & Company

At the same time, differences remain, especially in electrification and hard tech. The Tesla/X cluster started with EV and battery in electrification and has since entered robotics, space, and more. Alphabet entered hard tech through Waymo robotaxis and Wing delivery drones.

Lastly, omniscalers can act as major demand anchors, especially for the many industries upstream of cognitive and physical AI. For instance, Alphabet, Amazon, Microsoft, and Meta have all signed long-term power purchase agreements with nuclear power providers to secure clean firm power for data centers—a major driver of renewed interest in nuclear in the United States.[121]

Omniscalers generate more cash and invest it at higher intensity

Companies in future arenas, including omniscalers and others, grew revenues by 12 percent per year between 2022 and 2025, compared with just 1 percent for companies outside future arenas. But omniscalers' revenue is an order of magnitude larger than that of other arena companies. By 2025, omniscalers averaged about $200 billion in revenue each in future arenas, while other arena players averaged about a twentieth of that, about $10 billion each. In total, combining both future arenas and their other businesses, the omni-9 generated revenues of about $2.7 trillion in 2025. For context, $2.7 trillion is bigger than the GDP of Italy, the eighth-largest economy in the world.[122]

Cash flow is a key enabler fueling cross-arena expansion. From 2022 to 2025, the nine omniscalers generated, on average, operating cash flows equivalent to 26 percent of revenues every year, compared with about 16 percent for other companies in arenas and about 13 percent for players in other industries.[123] The scale is even clearer in absolute terms. In 2024, the omni-9 generated roughly $640 billion in cash, about the same as annualized US bank lending to nonfinancial businesses, and roughly three times total US equity issuance that year.[124] And while omniscalers have ample cash on their balance sheets and innovation capabilities in common, as noted above, how they initially earned them is quite distinct.

Omniscalers invest more than other arena players (Exhibit 13). From 2022 to 2025, omniscalers invested, on average, about 31 percent of their revenues in R&D and capital expenditures. That level of investment was much higher than for other companies in arenas (22 percent of revenues) and three times as high as what's seen in other industries (9 percent of revenues). To put this in perspective, nine omniscalers spent about $800 billion in 2025, more than half of the amount invested globally in the electricity sector that year.[125]

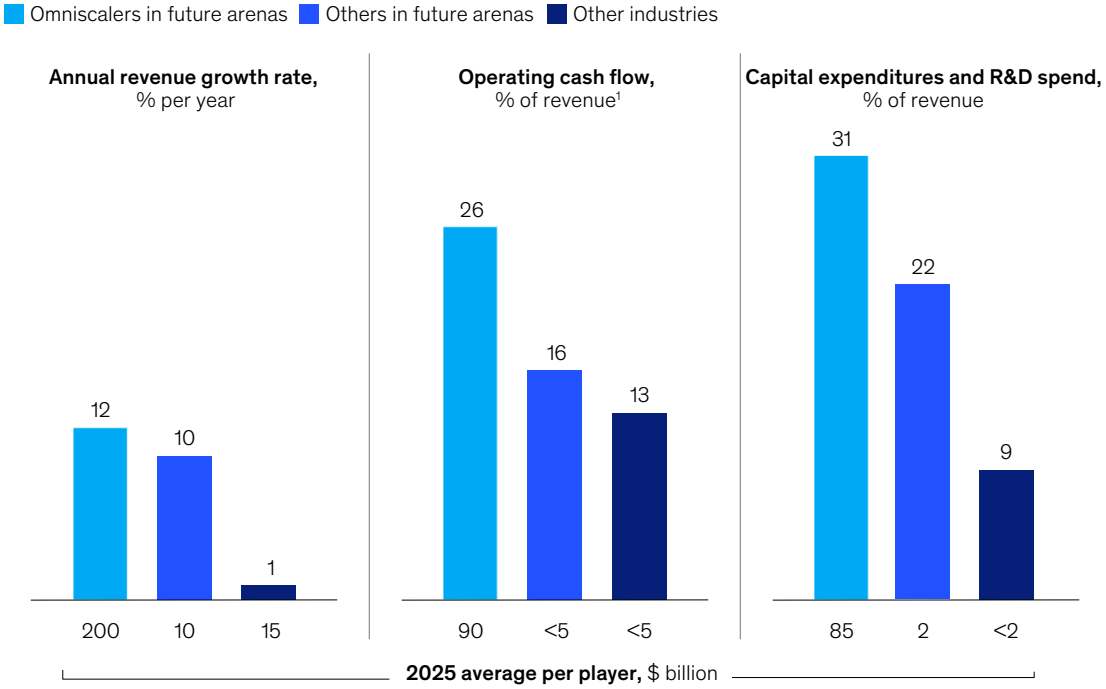
The features above are only some of what differentiates omniscalers from other players, though these factors do not fully explain their success. Others, including player-specific advantages—such as risk appetite, reputation, data access, and other capabilities—also matter (see sidebar "Why cash is not enough: Innovation in the omniscaler capability stack").

All these observations reflect recent historical performance; whether omniscalers' scale and elevated investment translate into sustained efficiency and attractive returns over time in the arenas where they are now expanding remains to be seen.

Exhibit 13

Omniscalers generate more cash and invest at a higher rate.

Average performance in 2022–25



Note: 2025 data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.
[1]Operating cash flow for omniscalers is reported on a total-company basis (ie, not limited to future arenas). Other players in arenas are non-omniscalers that generate more than 10% of their revenues from future arenas. Other industries include all remaining companies (ie, non-omniscalers generating 10% or less of revenues from future arenas).
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

McKinsey & Company

Sidebar

Why cash is not enough: Innovation in the omniscaler capability stack

Financial resources certainly matter. But omniscalers differentiate themselves from other cash-rich companies through added advantages that can act as flywheels, accelerating momentum and reinforcing competitive advantages. They tend to benefit from economies of scale, often part of the escalatory logic *within* arenas, when expanding *across* arenas. This is particularly the case when it comes to reusing technology, data, and infrastructure in the AI foundation and digitization arenas, which are also inputs to other arenas.

Their large cash reserves, distinctive capabilities, and appetite for risk are often paired with more traditional approaches to cross-industry growth. Reputation and talent reinforce each other across arenas. Capabilities developed in one arena can also be reused in others—not only data and technology, but also in customer relationships, distribution, infrastructure, operating models, and sometimes industrial assets. This crossing over lowers marginal costs and accelerates learning. For instance, Amazon's Prime Video streaming service leverages Amazon's broader customer base, checkout, and platform features from e-commerce.

Omniscalers take the risks to enter with long payback periods, regulatory uncertainty, and steep scaling curves through internal incubators or "other bets" segments to fund and staff initiatives.[1] Other companies outside of this list of nine of course also pursue moonshot projects; if and when those result in multiple globally scaled businesses across arenas, this list could expand. Prominent omniscaler traits include weathering large risks in search of large rewards and plugging new ventures into existing, scaled ecosystems. Alphabet made early moves into once-unmonetized video markets with YouTube, autonomous vehicles with Waymo, and drone delivery with Wing. Risk-taking has also produced misses, and part of the omniscaler advantage is the ability to shoot and fail: Meta's early metaverse spending triggered investor pushback, and Alphabet has shut down some of its many moonshots.[2]

Strong integration capabilities and steady M&A-fueled growth can also support omniscalers' ability to move across arenas. In our analysis, the nine omniscalers averaged about 100 acquisitions each over the past 20 years, roughly three to five times as many as other large companies inside or outside arenas. Alphabet and Microsoft each completed more than 200 acquisitions.[3] M&A strategies differ; some omniscalers have integrated hundreds of acquisitions, while others turn to inorganic growth via M&A much more sparingly.

Omniscalers' approaches remain diverse in other ways. Some compound their technology capabilities, especially in the AI foundation, more prominently than others. Some omniscalers take bigger swings, shuttering ventures that don't work. Some expand methodically into adjacent markets, as seen in Alibaba's move from e-commerce into payments and digital advertising.

Amid this diversity in approaches, one takeaway is consistent: Cash can fuel momentum when it comes to scaling across arenas, but only when it helps develop distinctive products and services in the escalatory race. Advantage lies in a reinforcing bundle of capabilities and assets. No single element determines cross-arena success; it is more likely the result of a combination of interlocking strengths.

[1] "Other bets" refers to Alphabet's reporting segment that aggregates multiple operating segments that are not individually material, including businesses such as Calico, GV, Verily, Waymo, Wing, among others.
[2] Bill McColl, "Meta investor calls for major changes," Investopedia, October 25, 2022; "Loon: Beaming the internet with stratospheric balloons," Alphabet, accessed March 2, 2026; "Makani: Harnessing wind energy with kites to create renewable electricity," Alphabet, accessed March 2, 2026.
[3] McKinsey Value Intelligence.

CHAPTER FOUR

The arenas are concentrated in the United States and China

In the original arenas report, companies based in the United States and Greater China were disproportionately represented in past arenas. The outsize exposure of the United States to arenas since 2005 has reflected and reinforced its faster economic growth. This dynamic remains true in the latest analysis, focusing on the 18 future arenas, but with differing regional dynamics coming into focus.

Arena-leading companies like US-based Nvidia and China-based BYD illustrate how competitive dynamics are playing out differently across regions. In semiconductors, Nvidia has materially reshaped the value mix among US-headquartered chip companies through its sharp rise in revenues and market cap. In EVs, BYD's rapid scale-up has driven China's share of global revenue higher even in the face of intense price competition.[126] In Europe, ASML's role in advanced lithography underscores how specialized capabilities can anchor global positions in key arena value chains, while Japan's Fanuc illustrates the region's strength in robotics and factory automation. And multinational

Sidebar

Defining regions by company headquarters

In this report, we measure regional exposure based on company headquarters, not by where revenue is generated. Of course, many companies in arenas operate globally, with end-to-end production, customers, and revenue streams spread across multiple regions. Of the 3,770 companies in our data set, roughly 75 percent of them report some overseas revenue, and approximately 30 percent generate more than half of revenue totals outside their home region.[1] High-profile examples include TSMC, Tesla, and BYD, each with substantial international revenue exposure. For instance, Tesla's overseas share of revenues was about 50 percent in 2024, and BYD's was roughly 30 percent.[2]

The limitations of this approach need to be kept in mind in interpreting the regional analysis. For example, revenues of Chinese companies operating in other countries are generating worker incomes and GDP in those overseas economies and can't all be attributed to China's economy. Nonetheless, we use headquarters-based regional assignment for two reasons. Most importantly, it aligns cleanly with objective and consistently reported company disclosures. Second, it helps highlight where technological know-how, escalatory investment, and capital formation are anchored. In addition, since most companies do have mainly domestic sales, it is a first-order approximation for country-level outcomes. In all cases, it is important to keep in mind that our findings reflect company data, not national economic data.

[1] Overseas revenue is calculated using a company's reported geographic revenue segments and comparing them with the location of the company's headquarters. Revenue generated outside the headquarters region (this report uses the United States, Greater China, Europe, Japan and South Korea (which we group together), and rest of world) is classified as overseas. This method provides a consistent but simplified allocation and should be interpreted as an approximation rather than a precise measure of cross-border economic activity

[2] "Form 10-K for the fiscal year ended December 31, 2024," Tesla, Inc., filed January 30, 2025, US Securities and Exchange Commission; "BYD reports its financial results in 2024: Revenue hits 777.1 billion yuan, up 23% year on year," BYD, March 26, 2025.

companies scaling in arenas are expanding to new hubs in emerging markets. For example, Morocco and Indonesia are attracting investment in batteries and critical materials to serve global EV supply chains.[127] As national market dynamics vary, so too do companies' performance metrics in arenas. Here, we go beyond market cap and revenue to include investment and returns. Tracking these metrics helps reveal a fuller picture of regional dynamics at work (see sidebar "Defining regions by company headquarters").[128]

Arenas have grown the most in the United States, with Greater China gaining ground

In the United States and Greater China, we found more arena-leading companies and more of the ingredients that make up the arena-creation potion.[129] In the rest of the world, there are fewer companies participating in arenas. And while past and future arenas have grown in market cap and revenue share everywhere, the patterns and underlying forces at work differ across regions (Exhibit 14).[130] Market cap and revenue are our primary arena measures, but they are shaped by structural differences by region. We complement them with a view of investment, profitability, and technological progress.

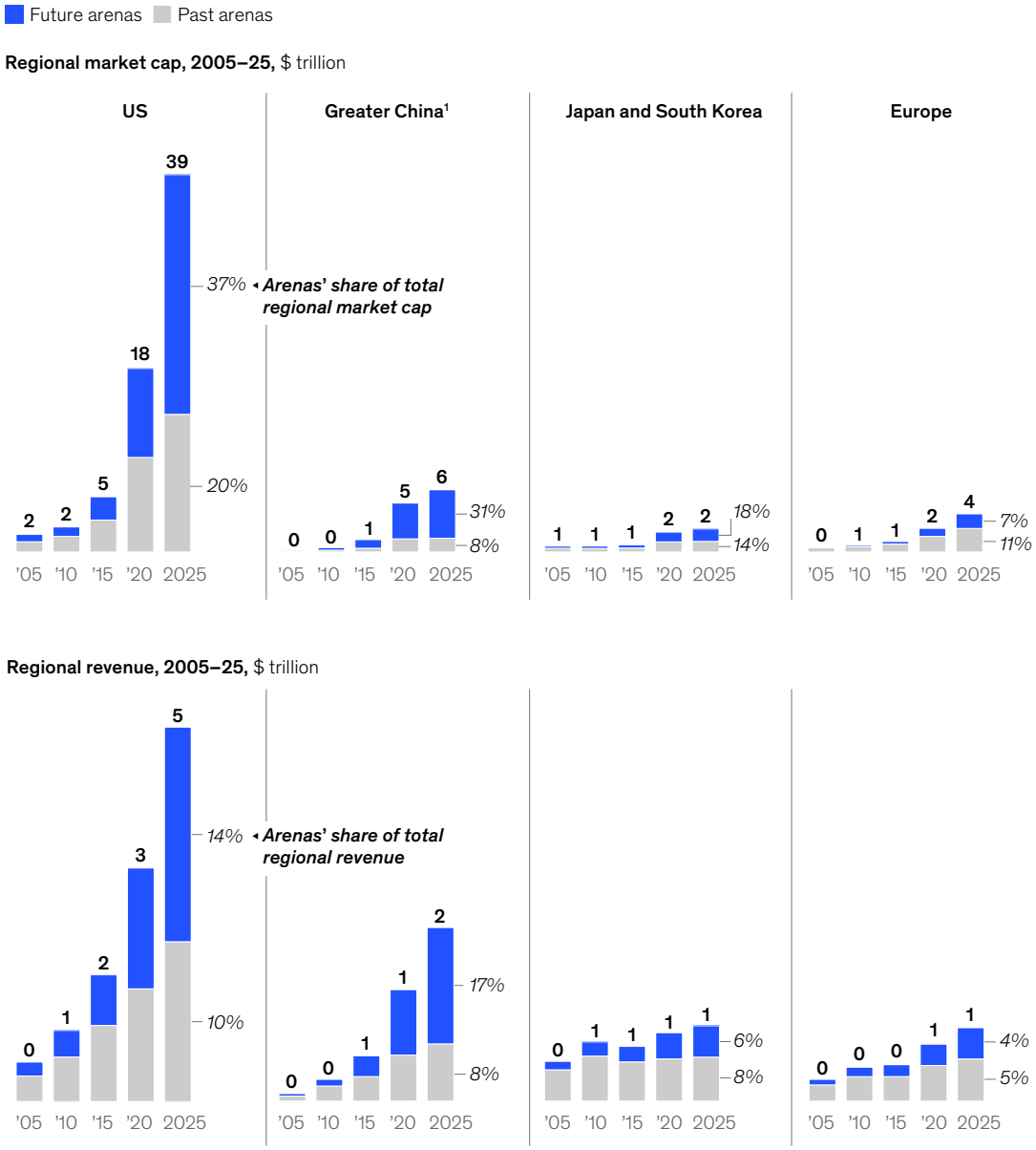
Companies headquartered in the United States have high exposure to arenas. In our set of companies, their combined market capitalization in past and future arenas accounts for more than half of total US market cap. About 37 percent of the US market capitalization total is in future arenas alone. In revenue terms, the arenas' shares of the US total is smaller, but the increase over the past two decades has been no less dramatic.

Companies headquartered in Greater China have strengthened their positions markedly. The share of market cap in the future arenas among Chinese companies more than tripled over the past two decades, from 9 percent in 2005 to just over 30 percent in 2025. The region raised its arena market cap (past and future) to nearly 40 percent of its total market cap. By revenues, Chinese companies have arena exposure similar to that of US-headquartered firms, about one-quarter of total revenues. Chinese companies typically trade at lower multiples in all industries, which helps explain why the region's revenue exposure is closer to that of the United States than its market cap is.[131]

Japan and South Korea have increased their share of market cap in future arenas while maintaining strong revenue exposure in past arenas, supported by industrial and consumer electronics. Europe, by contrast, remains less exposed. Only about 7 percent of regional market cap is in future arenas, with values changing more modestly over the period analyzed. That is to say, 93 percent of European companies' market cap came from industries that did not make up the 18 future arenas. In the rest of the world, large companies headquartered in Uruguay, Chile, and Israel have the next highest shares of future arena revenues relative to other industries. In India, nine future arenas along with nine industries that have arena-like features in the local market context could generate $1.7 trillion to $2.0 trillion in revenues by 2030, up from $690 billion in 2023.[132]

Exhibit 14

Arena companies are growing their share of regional market caps and revenues.



Note: Region defined based on headquarters location. Rest of the world excluded (10% of total market cap).
[1]Greater China includes Mainland China, Taiwan, Hong Kong, and Macau.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis

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Regional shares of arenas' market cap vary, but the United States stands out

Another way to interpret regional positions is to compare who leads each of the 18 future arenas rather than measuring only how much of a region's economy is exposed to arenas. The United States leads across arenas is the short answer, but the details matter.

By 2025, US-based companies accounted for roughly 75 percent of arenas' market capitalization globally. US companies led by market cap in 14 of the 18 arenas (Exhibit 15), compared with leadership by revenue in ten. In other words, in four arenas where US companies lead in market capitalization, they trail in revenue. The gaps are in EVs, modular construction, future air mobility, and robotics. One contributor is valuation dynamics: US capital markets, by far the largest and most liquid globally, offer deeper funding and investor participation that can support relatively higher valuations.[133] In both revenues and market capitalization, US omniscalers' activity is the largest contributor to the arenas landscape, most visibly in the AI foundation and digitization, but increasingly in hard tech.

Greater China anchors electrification, which is part of a broader story. The region generates roughly 40 percent more electricity than the United States and EU combined.[134] Among the three electrification arenas, Chinese companies lead in revenue and market cap. The region is home to about 70 percent of global market cap for batteries and nuclear fission as well as meaningful shares in EVs, semiconductors, and video games. China's CATL and BYD, for example, sit near the center of global battery supply chains as well as EV supply chains (see sidebar "From leading EVs by scale to leading EVs by value").[135]

China's market-cap shares should also be interpreted in context. Some arena activity is carried out directly by government and is not captured in company-level measures, and state-owned enterprise valuations are not easily comparable with those of publicly traded firms; these considerations are especially relevant in arenas such as space and nuclear.[136] Even where China does not lead in market cap value, its companies can lead on other indicators—for example, open-source AI downloads—while US firms lead in AI revenues.[137] A similar pattern is emerging in bio-frontiers. Some analyses suggest China-origin molecules represent a very large share of "new to human" drugs, with reportedly 46 percent of new drug molecules that began human trials in the first half of 2025 originating from Chinese biopharma companies.[138]

Elsewhere, Japanese and South Korean companies play large roles in the robotics and gaming arenas. Together, they account for roughly a quarter of market cap in robotics and video games, even though their overall share in all arenas is modest. Robotics leaders such as Japan's Fanuc have reported growing profits on rising factory automation demand, and both countries' firms remain central to global console and mobile gaming production.[139] In addition, companies headquartered in the region are key players in semiconductors (particularly memory and advanced manufacturing), led by global firms such as Samsung Electronics and SK hynix.[140]

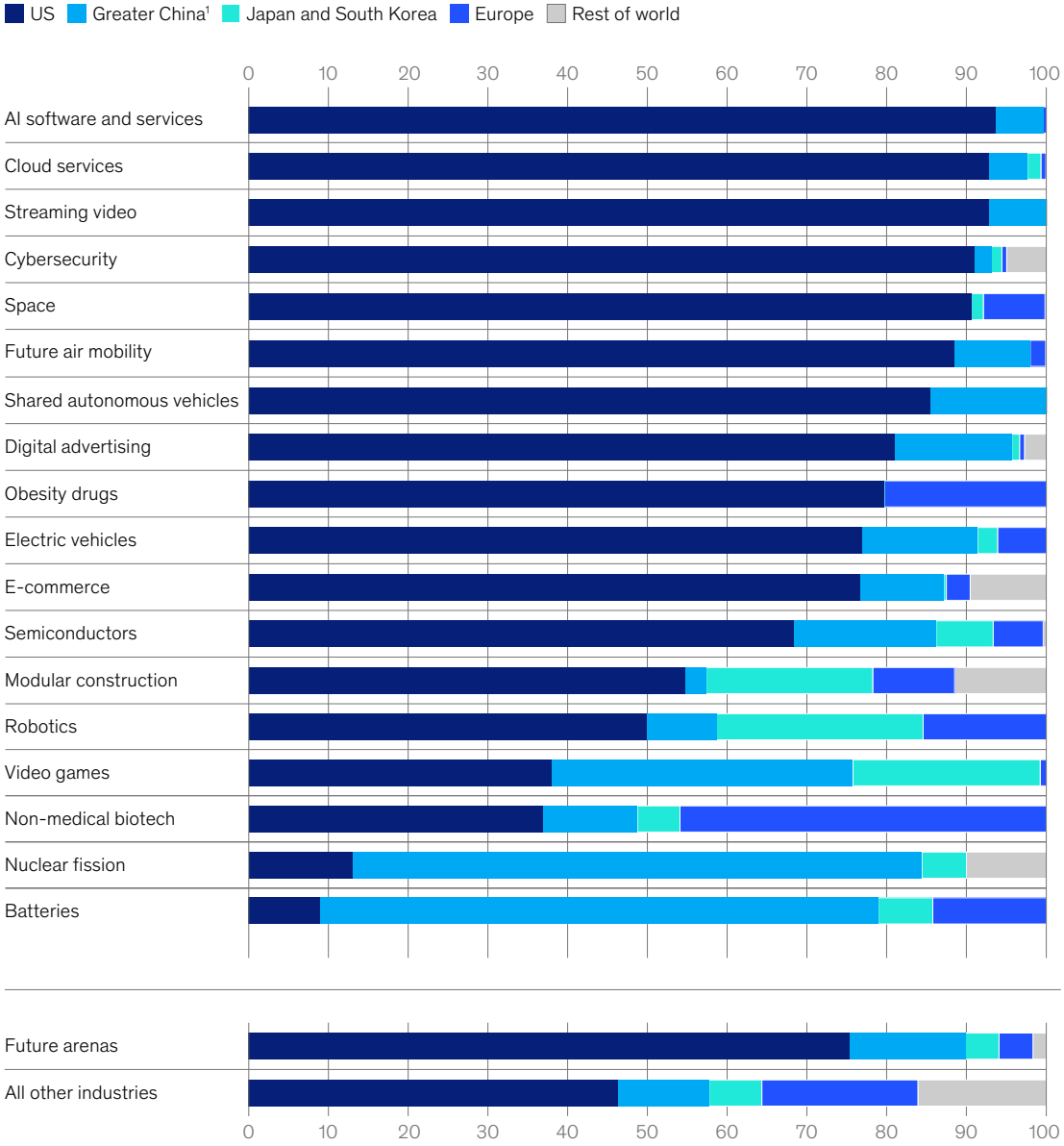
Europe's overall presence is modest, but it has clear specialized strengths. European firms hold a large share of market cap in non-medical biotech (about 45 percent of the global market) and a sizable share of obesity drugs and robotics. Novo Nordisk's position among global leaders in GLP-1–based obesity therapies (notably Wegovy) illustrates Europe's depth in bio-frontiers (see sidebar "Europe's competitiveness in arenas of the future"). Europe also has standout arena champions, such as ASML in semiconductors equipment, even though the region's aggregate position in semiconductors is smaller than that of the United States or Greater China. In digitization, the United Kingdom stands out as Europe's strongest hub, particularly in e-commerce, and ranks fourth globally in country-level revenue for the theme.

Finally, the rest of the world is becoming increasingly relevant in future arenas, less as headquarters locations and more as hubs for capital, capability, and supply chains. Gulf sovereign wealth funds are mobilizing capital into arenas and partnering with arena champions, for example Saudi Arabia's Public Investment Fund partnering with Google Cloud to build an AI hub.[141] India is emerging as a meaningful arena participant, with growing momentum in modular construction and robotics adoption.[142] Elsewhere in Asia, the Association of Southeast Asian Nations is gaining relevance as an arena-linked supply chain hub amid trade realignment.[143] Israel remains a standout in cybersecurity, with the sector accounting for 52 percent of Israel's private tech funding in the first half of 2024, and it continues to draw global interest (for example, Palo Alto Networks' acquisition of Israel-founded CyberArk).[144] In parallel, resource-advantaged economies are attracting arena-linked industrial investment; for example, Morocco in phosphate-linked battery materials and Indonesia in nickel-linked battery supply chains.[145]

Exhibit 15

Firms headquartered in the United States hold 75 percent of global market cap in future arenas.

Regional distribution of market cap by arena, 2025, %



Note: Region defined based on headquarters location.
[1]Greater China includes Mainland China, Taiwan, Hong Kong, and Macau.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis.

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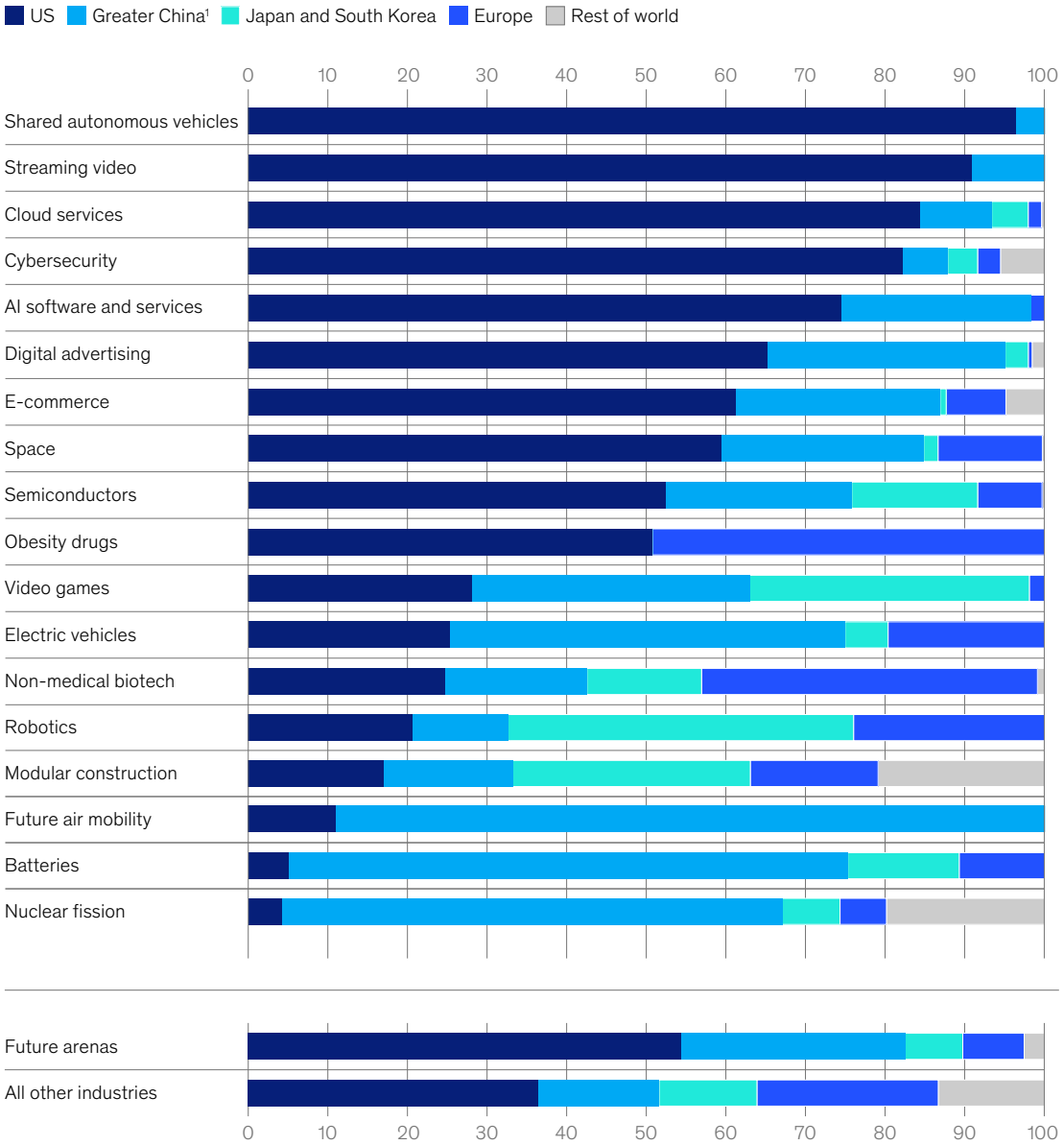
Exhibit 15 (continued)

In revenues, US firms generate more than 50 percent of global share while firms headquartered in Greater China generate 30 percent.

Regional distribution of revenue by arena, 2025, %



Note: Region defined based on headquarters location.
[1]Greater China includes Mainland China, Taiwan, Hong Kong, and Macau.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis.

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Inside the arena

From leading EVs by scale to leading EVs by value

The EV arena illustrates the benefits of considering revenue, market cap, and investment together to understand a region's position. The signals diverge: US players lead on market cap, Chinese players lead on revenues, while European players trail on both. Beneath some business headlines, momentum is shifting and competition is intensifying around cost, differentiation, and profitability.

Chinese EV companies lead in sales volume and revenues, but manufacturing overcapacity and price wars have been compressing margins.[1] In 2024, China's auto industry could build roughly 55 million vehicles (including hybrid and internal combustion engine vehicles), yet capacity utilization hovered around 50 percent.[2] To strengthen cost positions and supply resilience, leading players have pursued vertical integration.[3] BYD's in-house Blade battery and its platforms illustrate this approach, alongside its efforts to secure upstream inputs, such as lithium-mining rights in Brazil acquired in late 2023.[4] Cost pressures have also reinforced the continuously growing share of lower-cost lithium iron phosphate batteries that Chinese battery producers moved into early, now used in about two thirds of EVs sold in China.[5] Some of these efforts have paid off: BYD's net profit margin rose from 4 percent in 2022 to about 5 percent in 2024. In 2025, however, industry price cuts and higher R&D spending weighed on BYD's profitability, while Chinese producers' overcapacity remained a structural headwind.

In the United States, momentum has cooled and margin pressure increased. EV sales grew in 2024, but the pace slowed significantly in 2025; sales in the first half of 2025 were about 4 percent higher compared to the same period in 2024.[6] Profitability also tightened. Tesla's automotive gross margin fell from 28 percent in 2022 to 18 percent in 2025.[7] US players are increasingly tapping global supply: Waymo has partnered with Zeekr (Geely) on an all-electric vehicle platform designed for Waymo Driver.[8]

In addition, profitability is under pressure in Europe, despite continued growth. Since 2022, EV sales have increased steadily, extending through the first quarter of 2025 (20 percent growth compared to the same period in the previous year), yet margin pressure is evident.[9] Closing the cost gap is a near-term imperative, particularly on batteries. In 2025, Europe's average battery prices were estimated to be 56 percent higher than China's, reinforcing the need to accelerate cost reductions and scale in a more price-sensitive market.[10]

Overall profitability has been challenging for many EV players. Beyond a small set of scaled leaders—such as BYD, Tesla, and Li Auto—many prominent EV manufacturers reported losses in 2024.[11] This reflects a mix of insufficient scale, limited vertical integration and less control on costs, and an aggressive pricing environment that compresses margins.

The EV story illustrates a broader point that can emerge in arenas: the intense mode of competition can accelerate quality and long-term adoption, while shifting value to consumers through lower prices, better performance, and wider product choice. Despite margin pressure for OEMs, the market expanded quickly and is projected to remain on a strong growth pathway as OEMs and suppliers scale integrated value chains, and progress in batteries and charging continues.

1 "Chinese electric cars are trapped in a brutal price war," CNN, September 26, 2025.
2 "Massive overcapacity threatens to prolong China's car price war," *Straits Times*, June 19, 2025.
3 "New silicon carbide prospects emerge as market adapts to EV expansion," McKinsey, October 17, 2023.
4 "2022 annual results announcement," BYD, March 28, 2023.
5 *Global EV outlook 2025: Expanding sales in diverse markets*, International Energy Agency, May 14, 2025.
6 McKinsey Center for Future Mobility.
7 "Form 10-K for the fiscal year ended December 31, 2024," Tesla, Inc., US Securities and Exchange Commission; "Q4 and FY 2025 Update," Tesla, January 28, 2026.
8 *Waypoint (Waymo blog)*, "Expanding our Waymo One fleet with Geely's all-electric vehicle designed for riders first," Waymo, December 28, 2021.
9 "Executive summary," in *Global EV outlook 2025: Expanding sales in diverse markets*, International Energy Agency, May 14, 2025.
10 Colin McKerracher, "New record lows for battery prices," BloombergNEF, December 19, 2025.
11 "Brad Anderson, "Only four EV brands are profitable and two of them might surprise you," Carscoops, March 31, 2025; company annual reports from 2024.

Including investment and profitability gives a fuller regional view of arenas

Beyond market cap and revenue share, we look at capital expenditure and return on invested capital to learn more about regional inputs and outcomes.[146] Structural conditions across regions shape these patterns, but several notable exceptions also emerge; we explore them further below.[147]

As noted above, market cap values tend to be higher relative to revenue for US companies compared to Chinese companies, and that is especially true in future arenas (Exhibit 16). US companies in arenas also account for a higher share of capex and R&D versus other US companies. The higher corporate investment in arenas is not the case for investment more broadly; across all public and private fixed-asset spending, China invested roughly $7 trillion economy-wide in 2024, about 20 percent more than the US figure of $6 trillion.[148]

Across regions, US companies show the strongest profitability in the future arenas, with ROIC of 29 percent. Chinese arena returns remain lower than those in the United States and Europe, at about 18 percent, reflecting broader market differences and patterns of competition. Cross-country ROIC comparisons are directional due to measurement challenges as well, since differences in accounting, financing structures, and policy support (including subsidies) can affect both reported profits and measured invested capital. Results should therefore be interpreted in regional context.[149] Within China, arenas generate roughly twice the ROIC of the broader corporate baseline, indicating that they represent a disproportionate share of the country's higher-return opportunities.

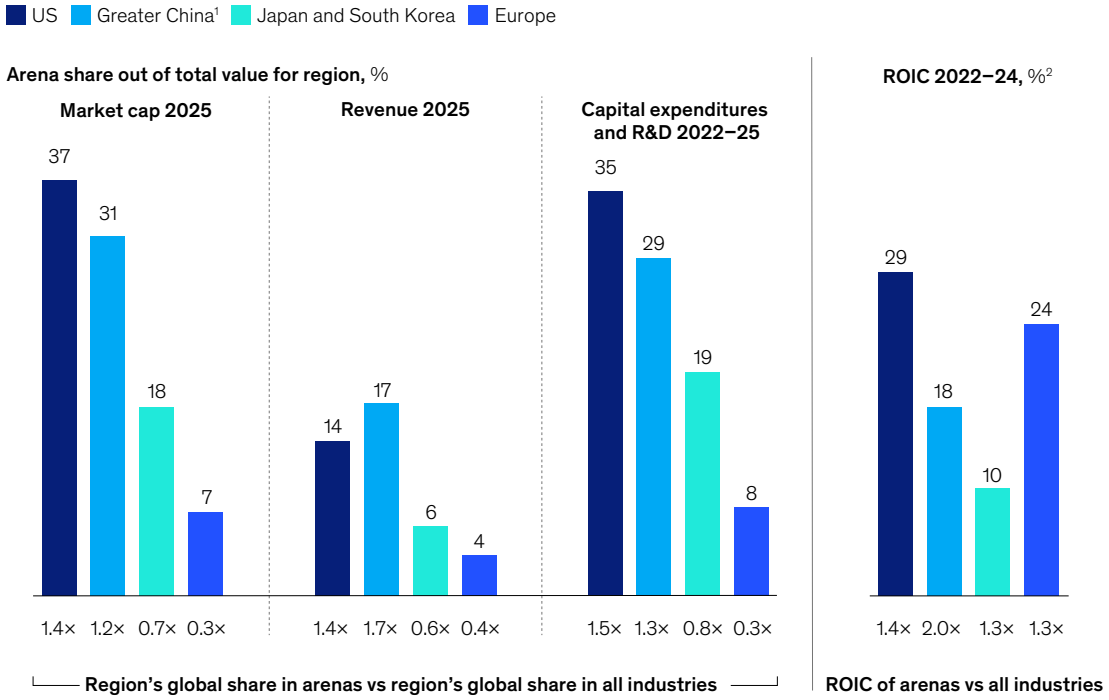
Europe's arena exposure is comparatively low in revenue, market cap, and investment, yet it ranks second on profitability. Even here, though, the five-percentage-point gap with US companies is larger than in non-arenas: Europe's economy-wide ROIC in the data set averages about 18 percent versus 21 percent in the United States (2022–24).

Japan and South Korea illustrate a different profile with more concentrated exposure anchored by a handful of technology-intensive champions. And while only 6 percent of their company revenues come from arenas, one-fifth of their investment in capital expenditures and R&D does, reflecting the weight of capital-intensive, innovation-driven sectors. Arena ROIC in both countries is three percentage points higher than their country averages, shaped in large part by giants such as Samsung and NTT.

In emerging economies and the rest of the world, recent foreign direct investment points to a meaningful build-out of future-shaping capacity beyond today's largest arena hubs. Other MGI research shows that announced projects in future-shaping industries that largely overlap with arenas could more than quadruple battery manufacturing capacity outside China, underscoring that emerging economies remain important hosts and builders of new industrial capacity.[150] India illustrates this momentum. Announced greenfield investment into India rose by about 35 percent in 2022–23 compared to prepandemic averages, driven largely by manufacturing, electronics, IT, healthcare, and renewable energy.[151]

Exhibit 16

US companies have the highest share of market cap and investment in arenas, while companies in Greater China have the highest share of revenues.



Note: Region defined based on headquarters location.
[1]Greater China includes Mainland China, Taiwan, Hong Kong, and Macau.
[2]ROIC of companies with 2024 revenue of more than $1 billion; 2022–24 weighted-average NOPLAT divided by invested capital (excluding goodwill and intangibles). Excludes companies without complete NOPLAT or invested capital time series in 2022–24. ROIC may be higher than the region average as the database skews toward large companies.
Source: McKinsey Value Intelligence; McKinsey Global Institute analysis.

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Sidebar

Europe's competitiveness in arenas of the future

Europe is starting to reform its investment environment to boost competitiveness. Ongoing efforts include mobilizing billions of euros in investment to build at-scale AI gigafactories in Europe and strengthening the region's semiconductor ecosystem under the EU Chips Act.[1] The reform efforts are timely given the importance of meeting the challenge across areas that will shape the future, from energy to technology to supply chains.[2]

MGI's 2026 article "Transforming Europe: Bold moves to lift a continent" estimates Europe's annual investment gap in AI and technology to be about €880 billion versus the United States. This is the sum of a €580 billion investment gap for corporate investment and at least €300 billion for start-ups and scale-ups.[3] A previous MGI article, "Accelerating Europe: Competitiveness for a new era," posited that the investment challenge is not uniform across industries, and shortfalls for European investment are most visible in technology and energy. What's more, Europe's venture-capital assets under management are only about one-fifth of the US total, suggesting ample room to deepen financing for innovation.[4]

This investment gap shows in future arenas. From 2022 to 2025, about 36 percent of US corporate capital expenditures and R&D flowed to arenas, compared with only about 8 percent for European companies. The gap is particularly pronounced in AI. In 2025, European companies attracted about $25 billion in AI and machine learning start-up investment, while the United States saw $235 billion in AI and machine learning venture deal value—roughly nine times more.[5]

Europe's opportunity is closely tied to raising investment in the most productivity-enhancing assets and scaling capabilities where it has established strengths, including advanced manufacturing, industrial robotics, connectivity infrastructure, climate technologies, bio-frontiers, and quantum technologies.[6] Some European companies are already making bold strategic moves. For instance, semiconductor companies are forging partnerships to strengthen the region's chip ecosystem. European incumbents in energy and industrial manufacturing are embedding gen AI at scale, pursuing AI-related acquisitions, and backing AI ecosystem programs.

1 "The Draghi report: One year on," European Commission, September 2025; "Accelerating Europe: Competitiveness for a new era," McKinsey Global Institute, January 16, 2024.
2 "Accelerating Europe: Competitiveness for a new era," McKinsey Global Institute, January 16, 2024.
3 This is the annualized investment gap, estimated from January 2024 to September 2025. "Transforming Europe: Bold moves to lift a continent," McKinsey, January 20, 2026.
4 "Accelerating Europe: Competitiveness for a new era," McKinsey Global Institute, January 16, 2024.
5 Pitchbook data for 2025 on completed and announced deals for all venture capital stages in AI and machine learning. Note that the cited data has not been reviewed by PitchBook analysts and may be inconsistent with PitchBook methodology.
6 Henning Soller, Duc Nam Nguyen, and Martina Gschwendtner, "Quantum technology investment hits a 'magic moment'," McKinsey, October 27, 2025; Matthias Evers, Antonia Stein-Asmussen, Nicole Szlezak, and Alexandra Zemp, "Europe's bio revolution: Biological innovations for complex problems," McKinsey, January 2023.

CHAPTER FIVE

Arena implications and actions for decision-makers

The future arenas are already transforming the economy. We are all in arenas now, in one way or another. This is true at the individual, household, company, city, country, and global level.

As future arenas set a faster pace for growth and dynamic competition, the impact of the AI economy is coming into view. A rapidly expanding AI foundation is reinvigorating the digital wave and opening opportunities related to electrification, hard tech, and new bio-frontiers. At the same time, a new type of company—the omniscaler—brings a new set of capabilities, and a lot of generated cash, that can further raise the stakes in existing and emerging arenas as their collective investments reach unprecedented levels, even while the economic impact remains to be seen.

Whether or not all of the 18 future arenas go on to outperform other industries and become full-fledged arenas is far from certain. Much will depend on the three swing factors identified in our original report.

— *Geopolitics* is increasingly shaping investment in semiconductors, battery supply chains, and more.[152] Looking ahead, the trajectory of policies on trade and national security, for example, could greatly affect how and where arena companies operate, especially if more technology stacks become regional.[153]

— *AI development and adoption* together have been critical forces behind the results described in this report. How AI progresses not only will affect the massive valuations in the AI foundation but could determine the pace of growth of every other arena.

— *The pace of electrification* will be reflected in the growth of EVs, batteries, and nuclear fission in some regions. It could also open opportunities for other related industries to reach arena status.

These swing factors help inform downside risk at the same time they may open new doors. Swing factors allow for future repositioning and even launches into new industries and business models that may otherwise be defended by incumbents with scale advantages or the like. And even when arenas look likely to outperform other industries at aggregate levels, there are no guarantees for individual companies. With heightened investment expectations come heightened risks.

As this report shows, major shifts are possible—even in a one- to two-year period. We will continue to watch how the arenas develop and update as needed.

Strategy in the arenas

For companies competing in or anywhere near future arenas, blind spots may be widening. Traditional strategy tool kits are no longer adequate, and the risks and rewards of getting it right are ever increasing.[154]

For any CEO, the central question is whether exposure to arenas will improve the fundamental drivers of value in the business: returns on invested capital and growth. We generally see four foundations that underpin long-term value creation from strategy; they are ROIC and growth as the financial drivers, managing for the long term, market attractiveness, and competitive advantage.[155] The opportunities and demands of arenas intersect with all four.

In response, CEOs and senior executives could benefit from understanding their companies relative to the full landscape of arenas and their upstream and downstream impacts.

To do this, CEOs and senior executives could first think about *proximity* and ask: Is my company competing in an arena? Is it near an arena that affects customer decisions, value capture, or control of key interfaces? Or is it on the fringe of an arena that will have incremental effects or impact on future competitiveness?

— *In the arena:* The combination of escalatory dynamics and the speed of change compresses decision windows and removes many of the options incumbents historically relied on. Here, committing early to a new success model, reallocating resources at speed, and reshaping governance to act with agility are three key tasks at hand.

— *Near an arena:* Even without directly competing in the arena, performance may be tightly linked to it, for instance as a supplier of components, infrastructure, services, or distribution. In such cases, the arena may represent a fast-growing share of the company's value creation potential. In other cases, arenas nearby could become direct competitors for demand, requiring offensive or defensive moves. It can be useful to engage early, before value pools settle, using early signals to clarify where to play and what capabilities or partnerships could matter most while flexibility remains.

— *On the fringe of an arena:* Before new forces of demand even fully come into view, the risk is not disruption today but underperformance tomorrow, if peers adapt faster. Use added time to reallocate resources and otherwise get ready to move, as this positioning rarely remains static for long.

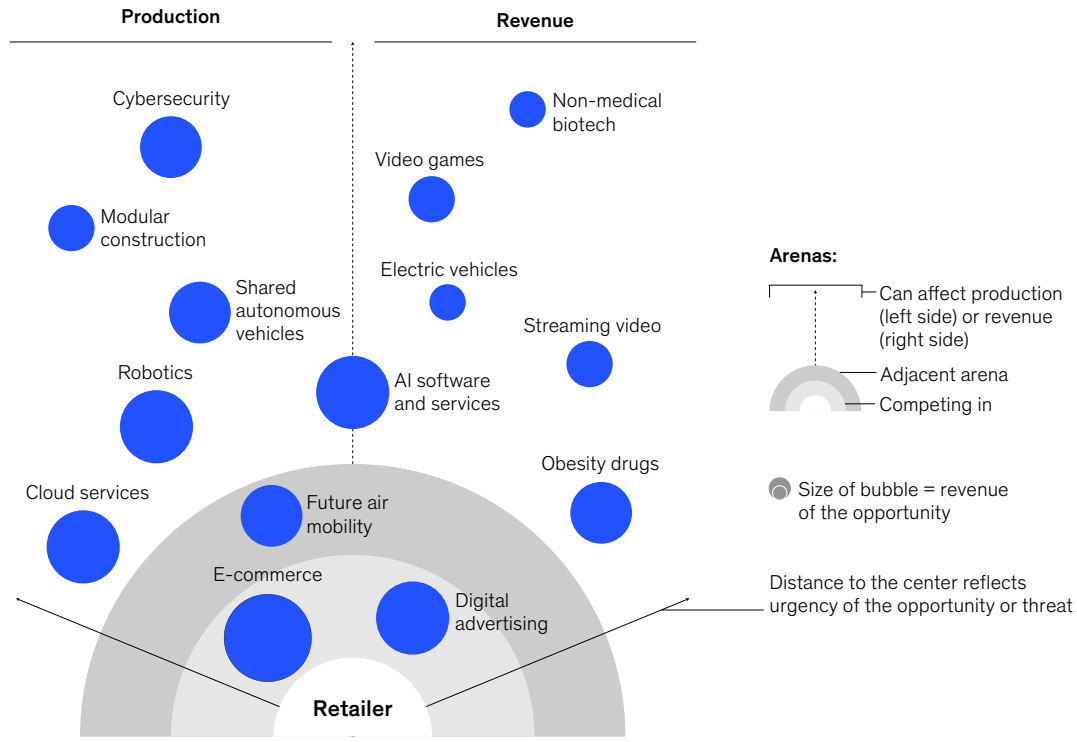
A second consideration is *how* an arena will affect a company's core business. Will it be through the supply side (including production, operations, and input costs), through the demand side (revenues pools and customer shifts), or both? Assessing both proximity and positioning in production and revenues is what we might call activating "arenas radar" (Exhibit 17). This radar view helps track opportunities and threats over time by scanning signals, translating them into operational and growth implications, and aligning capital allocation accordingly.

Importantly, escalatory investment in an arena should not be viewed as an automatic imperative. McKinsey's *How strategy champions win* research finds that above-median capital expenditure can help move companies up the Power Curve, but only when it is matched with a credible path to competitive advantage.[156] Entering or expanding within an arena is therefore not simply about exposure to growth; it requires a clear view of whether the company can earn returns exceeding its cost of capital and defend its position as competition intensifies.

Exhibit 17

Arenas are closer than they appear.

Retailer example



Source: McKinsey Global Institute analysis

McKinsey & Company

In Exhibit 17, we sketch the "arenas radar" view for a multinational retailer. In arenas, the company may be competing in e-commerce and digital ads, for example. Delivery drones (developed within the future air mobility arena) emerged adjacent to e-commerce as a potential disruptor. Robotics could likewise streamline warehouse logistics. In both cases, a question arises of whether to partner, procure, or even build an in-house capability to be even more competitive in core businesses—or be left behind. On the revenue side, this retailer could spot opportunities to offer new nonmeat protein products, biomaterials, or drugs on its shelves, tracking the latest in bio-frontiers.

The arenas in the "bull's-eye," where a company can compete or already is competing, need to be incorporated into strategic planning for financial and talent investments. That planning must reflect the intense mode of competition arising from the elements of the arena-creation potion. Ask whether your company is keeping up with the technology resets and escalatory investments related to production. Is your company adequately gauging market growth and figuring out how to address new demand to generate revenues? For companies in or adjacent to arenas, this may imply allocating capital earlier and more aggressively, either to defend access to critical inputs—such as computing power, energy, and supply chain capacity—or to fund entry into newly opening markets before too many others arrive.

When arenas are further away, there is still a need to move quickly to allocate resources competitively. On the production side, ask: Are there any arenas that might transform corporate operations? On the revenue side: Are there new opportunities in arenas with growing markets to pursue?

Depending on a company's core business, fewer arenas might be on the radar compared with retail, but with even more critical dependencies. A machinery manufacturer upstream of the physical AI arenas might see demand transformed; knowledge industries have high productivity potential from AI software and services; and food and fashion industries are adapting for populations with widespread access to weight-loss drugs.

Implications beyond strategy

The implications extend beyond the executive suite. Tracking arenas also makes sense for investors aiming to maximize their returns, job seekers searching for careers in growing industries, and policymakers looking to play a role in how and where these industries develop.

As capital, innovation, and talent shift ever faster, policy choices increasingly determine where ecosystems will reach scale and who captures value. Chapter 4 highlights how regional systems are already producing divergent outcomes; US strength in the AI foundation reflects deep capital markets and omniscalers' ability to mobilize infrastructure at scale, while China's position in electrification reflects faster build-out and execution capacity in EVs, batteries, and nuclear. In many arenas, time to scale is emerging as a differentiator. Permitting speed, grid and energy availability, and predictable rules can shape investment flows alongside technological advances.

The same analytical approach used for companies applies to countries, regions, and cities. Useful questions include "Is the region already in an arena?" and "How can the region realistically enter or secure an adjacent role?" A diagnostic that maps existing strengths (skills, infrastructure, supply chain links, and early private investment signals) against arenas can reveal potential growth opportunities. For example, a deep dive into the implications of the 18 future arenas for New York showed potential for growth in digitization arenas in particular as well as transformative potential for city life with physical AI and modular construction.[157]

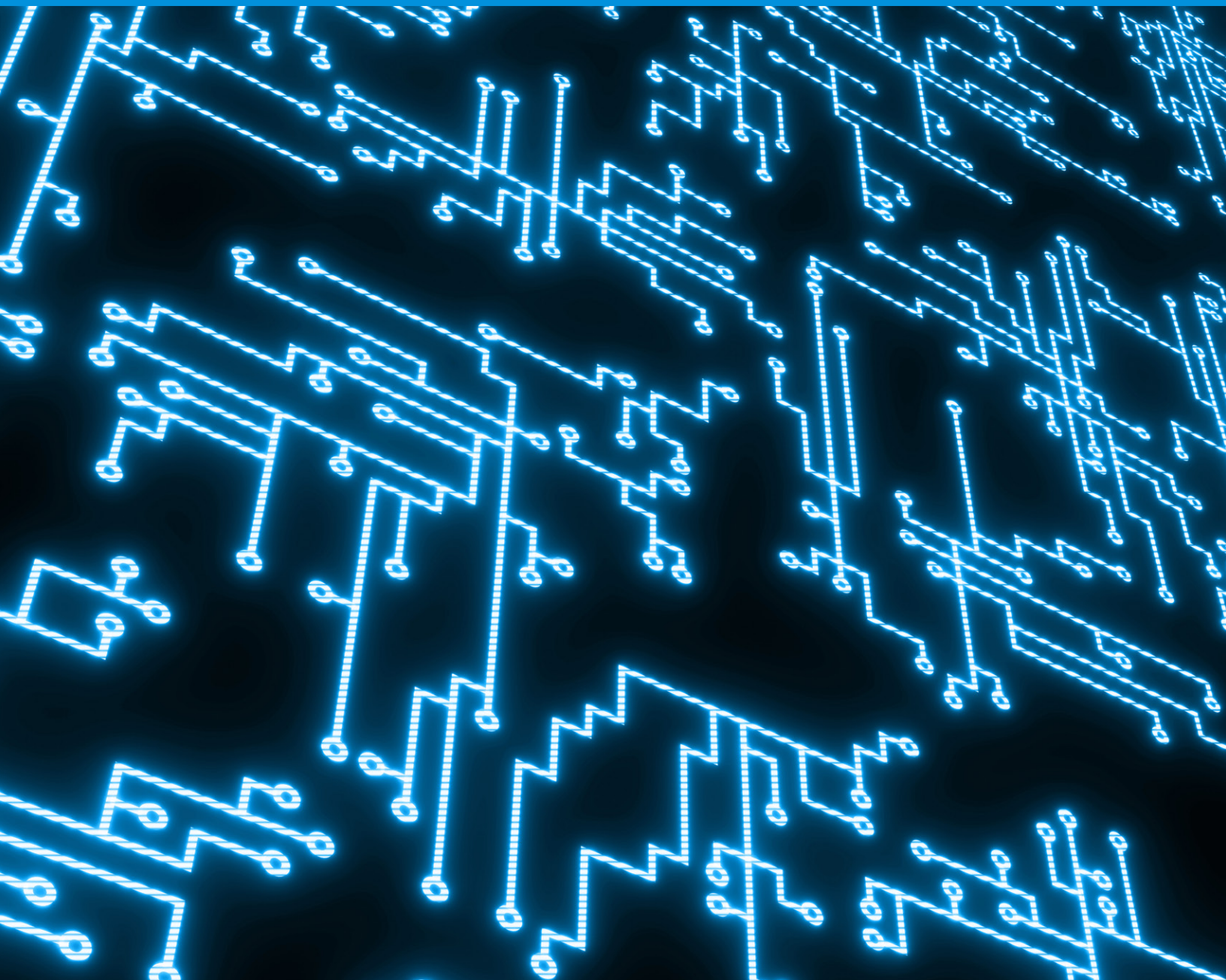
Disruptive technologies change how we live and work. What policies and institutions are needed to channel these shifts for societal gain is a critical question beyond the scope of this report.

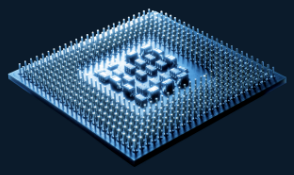
Understanding how arenas evolve and how they could further change the business landscape can offer valuable foresight today. The next big arenas of competition are closer and more consequential than many believe. If you are in an arena, the pace of change and competition is dizzying. If you are not, you risk being left behind or growing at a much slower rate. With a better grasp of arenas, leaders can anticipate—and act on—the accelerating pace of change.

Future arenas compendium

From 2022 to 2025, each of the 18 future arenas saw many remarkable developments. This section offers a collection of recent developments with direct impact on growth and dynamism, keeping the focus on revenues and market value. The collection should not be read as a comprehensive account of the industries covered. The 18 future arenas are grouped according to the five themes.

AI foundation





Semiconductors

Designers and manufacturers of semiconductors, microchips, and integrated circuits, as well as providers of tools for semiconductor manufacturing.

Arenas report revenue scenario for 2022–40

$1.7–2.4
2040 revenue scenarios, $ trillion

6–8%
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

Hyperscalers have ignited an AI data-center capital expenditure boom, boosting demand for chips. Global data-center capital expenditures surged 59 percent year-on-year in the third quarter of 2025 and are expected to rise further.[1] McKinsey estimates that roughly 60 percent of data-center investment is directed toward chips and computing hardware.[2] Compute and data storage accounted for 45 percent of global semiconductor revenue in 2024, with an additional 25 percent in wireless, and much of the rest in automotive and other chips.[3]

Supply—particularly for the most advanced GPUs—has faced constraints at varying points along the value chain, with the main bottlenecks shifting over time. In recent years, high-bandwidth memory (HBM) and advanced packaging were major pinch points.[4] In 2026, constraints are broadening again. Memory supply is expected to remain tight, and leading-edge nodes are also under pressure.[5] Memory suppliers' performance has improved; SK hynix's 2025 operating profit was about double the 2024 figure, and Micron's was about 7.5 times higher than in 2024.[6] Nvidia continues to anchor the AI stack, with a market cap exceeding $4 trillion by the end of 2025, and it shipped more than 90 percent of merchant servers with embedded GPUs in the fourth quarter of 2024.[7] Hyperscalers are building AI chips in-house—for example, Alphabet designs its own (called tensor processing units or TPUs), and a long tail of start-ups is emerging to target specialized chips for AI training and inference.

Geopolitics is reshaping where capacity is built.[8] The US Semiconductor Industry Association reported $640 billion in announced private investments in its chip sector since 2020.[9] China launched a third state-backed, chip-focused "Big Fund" worth more than $47 billion.[10] Europe and Japan are also attracting new capacity, including the TSMC-led fab planned for Dresden and Micron's reported plan to invest in an HBM fab in Hiroshima.[11]

By the numbers

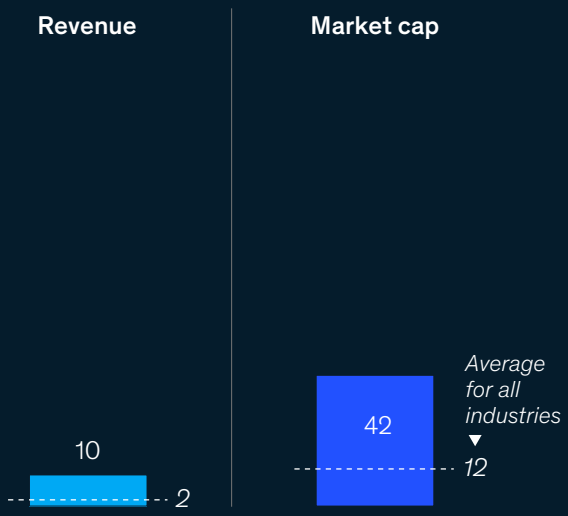
220 gigawatts
medium-case estimation for global data-center demand, driven by incremental AI capacity[12]

2-nm
logic nodes entered mass production in late 2025[13]

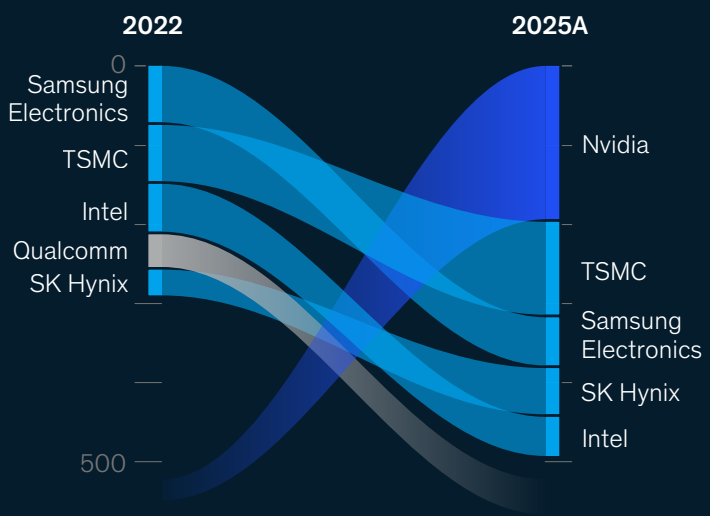
>10×
increase in economic profit for the memory segment from 2024 to 2025[14]

$165 billion
TSMC's planned investment in its Arizona complex, one of the largest FDI commitments in US manufacturing history[15]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.

Cloud services

Companies that deliver on-demand cloud infrastructure and platforms as a service.

Arenas report revenue scenario for 2022–40

$1.6–3.4
2040 revenue scenarios, $ trillion

12–17%
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

Cloud services are scaling as the backbone of the digital economy. Global cloud services revenue grew at an 18 percent CAGR from 2022 to 2025. AI is driving rapid demand growth, while digitization and cloud migration continue to expand. For example, Microsoft reported 39 percent growth for Azure and its other cloud services in the quarter ending December 2025, with AI cited as a driver.[16] As real-time AI usage grows, workloads are shifting to edge sites closer to users.

Scale and capacity keep the market concentrated. Amazon remains the largest provider, though Microsoft and Alphabet are growing faster from lower bases. Oracle, by contrast, has grown through supplying large-scale cloud compute capacity rather than competing across the full spectrum of cloud services.[17] AI specialist cloud providers ("neoclouds"), which lease GPU capacity and sell it as GPU as a service, are also expanding. CoreWeave, for example, scaled rapidly, though with high customer concentration (62 percent of its 2024 revenue came from Microsoft).[18]

Constraints are tightening despite efficiency gains. US data-center electricity use could rise by about 460 terawatt-hours from 2023 to 2030, which would triple data centers' share of total US electricity demand, from 4 percent to about 12 percent.[19] Meanwhile, the cloud landscape is becoming more geopolitically segmented. In Europe, US hyperscalers earn roughly 70 percent of cloud revenue, but EU sovereignty rules are driving more in-region and sovereign-cloud builds, while "trusted cloud" policies aim to boost European providers.[20] China, too, is accelerating build-out domestically.[21]

By the numbers

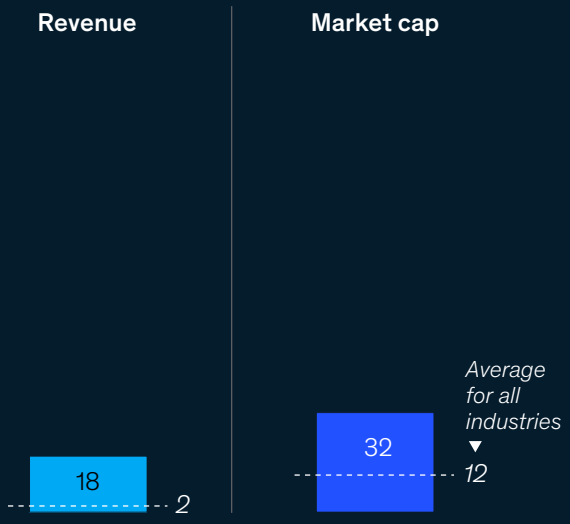
>$350 billion
capital expenditures by 4 hyperscalers in 2025, with most allocated to AI infrastructure and increasing commitments for 2026[22]

>$80 billion
equity investment in cloud and edge computing in 2024[23]

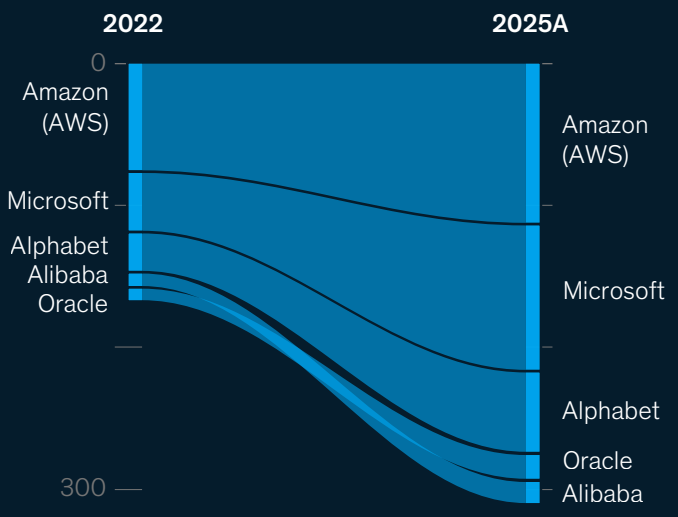
92%
US real GDP growth in H1 2025 coming from investment in information-processing equipment and software[24]

2.7×
year-on-year revenue growth in 2025 at CoreWeave, underscoring rapid expansion in the neocloud segment[25]

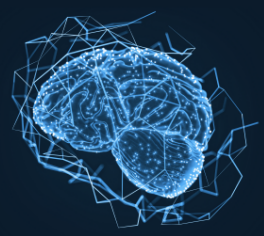
Annual growth rate, 2022–25, %



Top 5 players (including AI software), ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.



AI Software and Services

Companies that provide software and services using AI, excluding hardware necessary to operate AI.

Arenas report revenue scenario for 2022–40

$1.5–4.6
2040 revenue scenarios, $ trillion

17–25%
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

AI software and services is the fastest-growing arena. In 2025, nearly 90 percent of enterprises surveyed reported using AI in at least one business function. Although its share is growing, AI still represents a modest portion of the $700 billion global software market.[26] Access to large-scale compute remains a binding constraint as energy, chips, and data-center capacity lag behind demand.

A small set of US and Chinese platforms leads, alongside emerging European and open-source ecosystems. US hyperscalers and model labs are tightly interwoven through shifting financial and technical partnerships. Alphabet is integrating Gemini AI into consumer products like Google search and Gmail. In China, competition is intensifying around Baidu's Ernie, Alibaba's Qwen, DeepSeek, and other models. At the same time, thousands of specialized AI products are emerging, such as tools for identifying and optimizing drug candidates.[27] Saudi Arabia and the United Arab Emirates have announced a combined $2 trillion in broad investment commitments spanning AI, cloud, compute, and related strategic sectors.[28] Monetization is broadening beyond subscriptions and pay-per-use API tokens. In early 2026, OpenAI started testing advertising for users of a free version of ChatGPT.[29]

Model capabilities are rapidly advancing. Continuous releases are expanding context windows, improving reasoning, and lowering costs. Open-source systems are narrowing the performance gap for developers working outside the frontier labs' ecosystems. Total AI spending, including AI infrastructure, reached $1.8 trillion globally in 2025, although many enterprises are just starting to scale AI implementations beyond pilots as of early 2026.[30] Simultaneously, data-governance and IP concerns are pushing regions toward tightening AI regulations through measures such as the EU's 2024 AI Act.[31]

By the numbers

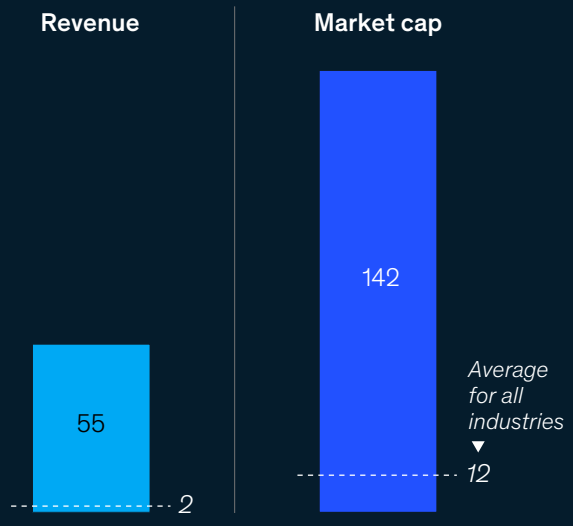
88%
of organizations used AI in at least 1 business function in 2025 vs 78% in 2024[32]

$1.8 trillion
total worldwide AI spending in 2025 including AI infrastructure[33]

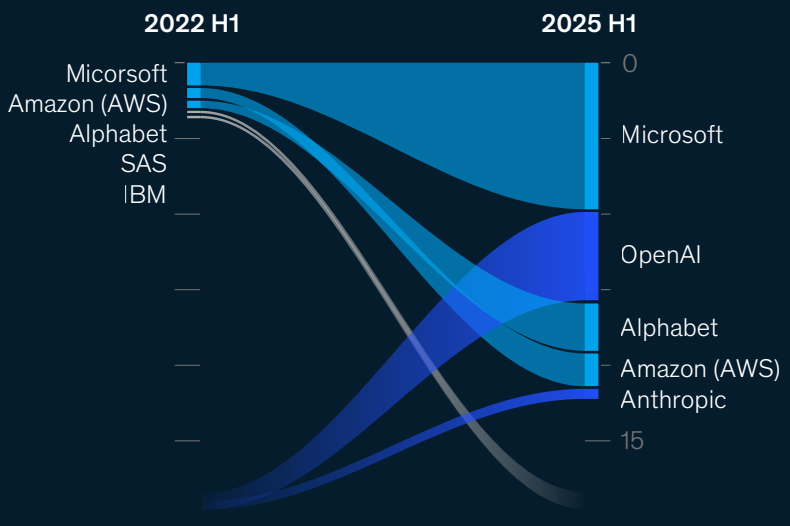
$240 billion
in trailing-12-month AI VC deal value (Q4 2024–Q3 2025), up 128% vs the prior period, evidence of accelerating capital inflows[34]

39%
of respondents report some EBIT impact from AI, with most citing contributions of less than 5%[35]

Annual growth rate, 2022–25, %

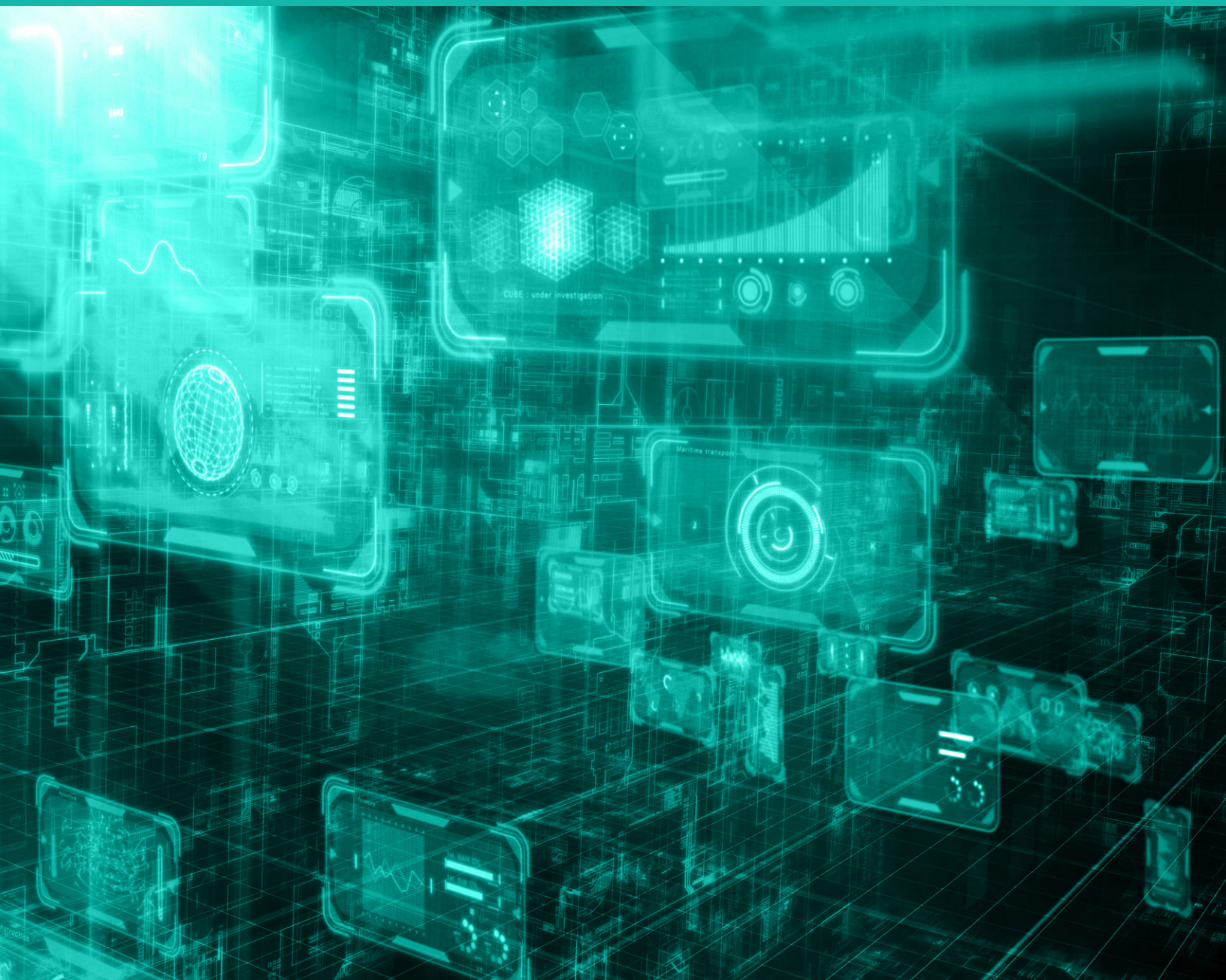


Top 5 players, ranked by AI platform revenue



Source for the top 5 players: IDC, Artificial Intelligence Platforms by Vendor, 2022 H1 and 2025 H1, $ billion.

Digitization



Digital advertising

Platforms that enable advertisers to reach consumers digitally.

Arenas report revenue scenario for 2022–40

$2.1–2.9
2040 revenue scenarios, $ trillion

8–10%
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

Digital advertising continues to expand, fueled by closed ecosystems and first-party data. Digital channels accounted for more than 70 percent of global ad revenues in 2024, with about $790 billion spent online.[36] Retail media remains a key growth engine, and it surpassed total TV ad revenues for the first time in 2025.[37] TV still matters, but the mix has shifted: In 2025, linear TV's share fell to 12 percent of global ad spend (compared to 40 percent in 2013), while global connected TV scaled to $40 billion.[38]

Budgets remain concentrated in a few digital ecosystems, but competition is widening. After a pullback from 2022 to 2023, ad-tech funding and deal activity have shown signs of rebounding.[39] Still, distribution and monetization continue to consolidate around scaled, data-rich interfaces like search and retail media. Alphabet, Meta, Amazon, and ByteDance generate about 70 percent of digital ad revenues in our database. Elsewhere, marketplaces such as Temu and Shein are building billion-dollar ad businesses. Connected TV majors (like Roku and Alphabet's YouTube) are emerging as significant closed ecosystems.

AI is reshaping digital advertising on two fronts. First, consumer internet behavior is changing as AI summaries and assistants reduce referrals to the open web, and platforms like OpenAI's ChatGPT are poised to monetize this attention directly. Survey data indicate demand is moving away from publisher sites, with roughly half of consumers intentionally using AI-powered search engines.[40] Second, AI is changing how brands plan and deploy spend and is transforming ad production through faster creative iteration and sharper audience targeting.[41] As brands create, test, and optimize directly, the ad-tech "middle layer" that monetizes spend could be disrupted.

By the numbers

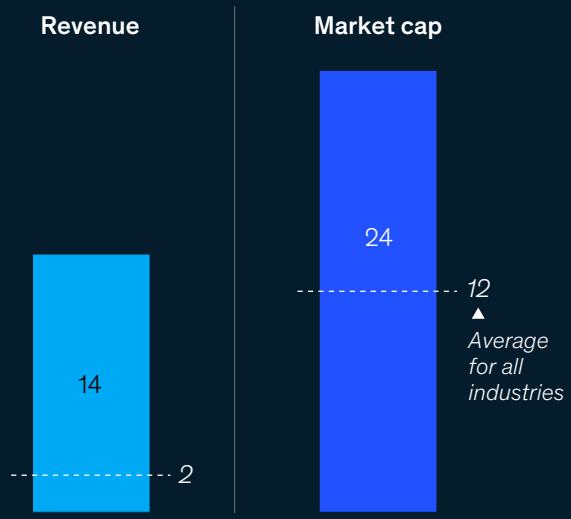
50%
of users employ AI for online search, with most users saying it's their top digital source for making buying decisions[42]

14%
annual growth of VC funding into the ad-tech sector in 2024, with roughly 30% of VC dollars going into AI-powered ad-tech tools[43]

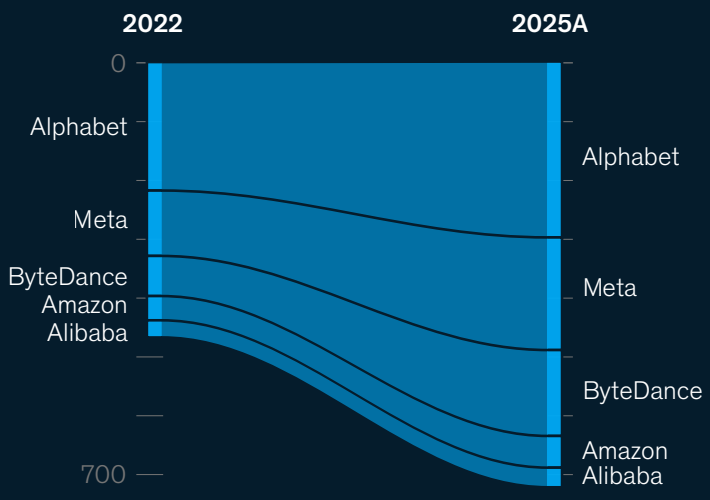
>50%
of advertisers planned to increase spending on commerce media networks in 2025 vs 2024[44]

96%
of media and telecom respondents report using AI in at least 1 business function, the highest adoption rate of any industry in 2025 survey[45]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.

E-commerce

Companies that sell goods through digital channels and fulfill them directly.

Arenas report revenue scenario for 2022–40

$14–20
2040 revenue scenarios, $ trillion

7–9%
Annual growth, 2022–40, %

Status vs 2040 scenario

Middle track of 2024 report

Global e-commerce is expanding from a large base. E-commerce retail sales hit more than $6 trillion in 2024, roughly 20 percent of total retail sales worldwide.[46] Growth is propelled by new models, including hyper-value and cross-border marketplaces, interest-based commerce, and quick commerce (under-one-hour delivery). Emerging markets also drove growth; for example, Vietnam's gross merchandise value (GMV) rose 23 percent year-on-year in the first half of 2025.[47]

Market value has been anchored in Amazon and Alibaba, but the top tier is reshuffling as value-commerce (PDD) and interest-based platforms (ByteDance) scale. PDD gained share with competitive pricing enabled by supply chain and customer acquisition efficiency. From 2022 through June 2025, TikTok Shop's GMV reportedly increased more than tenfold, tightening the link between entertainment feeds and transactions.[48] Incumbents (Alibaba, Amazon, and JD) are using quick commerce to increase traffic, while regional leaders like MercadoLibre maintain top positions in home markets. Asia-linked supply advantages underpin Temu and Shein's cross-border model; the EU imported 4.6 billion low-value items in 2024, many linked to these platforms.[49] But commerce costs are changing. The EU plans to end its €150 duty relief in 2026, and the US ended its $800 *de minimis* duty-free exemption in 2025.[50]

AI adds a new disruption layer by lowering digital store costs (content creation, promotions, and customer service) and keeping more of the research-to-purchase journey inside platforms via shopping bots and embedded checkouts.[51] As agentic commerce emerges, competition is moving from winning clicks to winning the agent. Examples include Amazon's Rufus, Alphabet's AI Mode shopping experience, and ChatGPT Instant Checkout via payment processor Stripe.

By the numbers

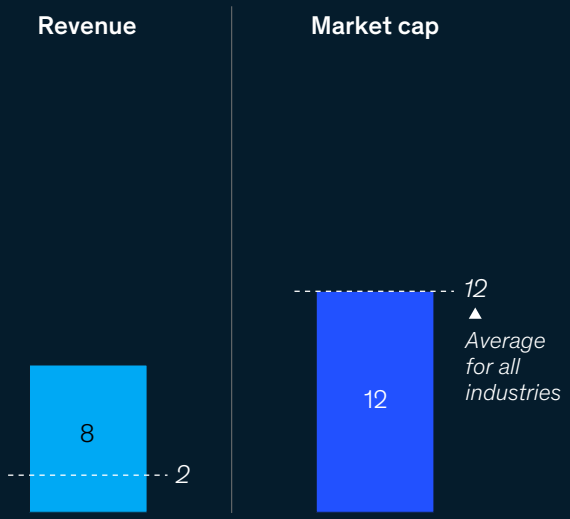
>13%
e-commerce's GMV annual increase in Southeast Asia, compared with 5–10% in Europe and the US in 2025[52]

3×
ByteDance's Douyin and TikTok Shop GMV in 2025 vs 2022, indications of the pace of social commerce growth[53]

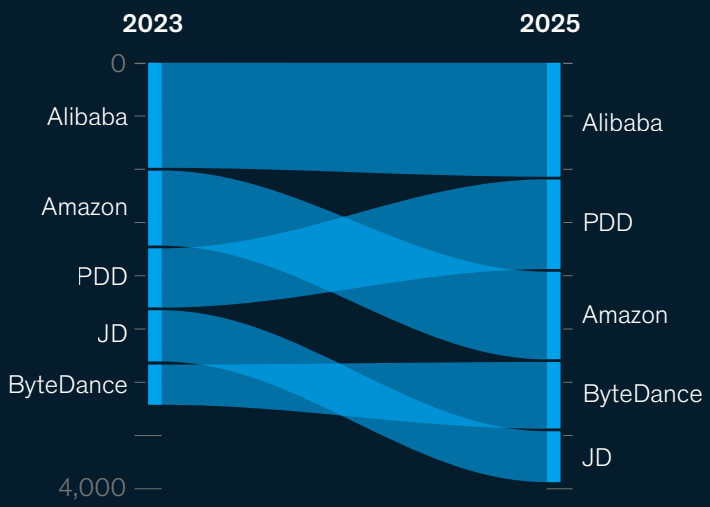
4.6 billion
low-value (less than €150) parcels entered the EU in 2024, 3x more than the 1.4 billion in 2022[54]

38%
of US consumers reported using generative AI for online shopping in 2025[55]

Annual growth rate, 2022–25, %



Top 5 players, ranked by GMV



Note: Sources in the endnotes. GMV = gross merchandise value, $ billion. 2023 used as the baseline year given data availability. PDD stands for Pinduoduo and includes Temu. ByteDance includes Douyin and TikTok Shop. Source: ECDB

Streaming video

Providers of on-demand video entertainment over the internet.

Arenas report revenue scenario for 2022–40

$0.5–1.0
2040 revenue scenarios, $ trillion

6–11%
Annual growth, 2022–40, %

Status vs 2040 scenario

Middle track of 2024 report

Streaming video shifted from growth-first to a more disciplined approach, with streaming revenues rising about 9 percent annually from 2022 to 2025. Streaming hit a record 45 percent of total TV usage in 2025, while broadcast and cable declined. YouTube continues to gain share, competing for attention with subscription video on demand services, whose growth is fastest in emerging markets.[56]

A small set of large players still leads, with priorities shifting from a growth-first mentality toward profitability. Netflix, Disney, Alphabet, and Amazon together generate more than half of streaming revenue in our database. Consolidation underscores the race for leadership. In 2025, Disney completed the acquisition of Hulu, the Skydance–Paramount merger closed, and both Netflix and Paramount engaged to acquire Warner Bros. Discovery (Paramount's offer was accepted in late February 2026).[57] Streaming companies were expected to spend about $95 billion on content in 2025, surpassing commercial broadcasters.[58] In addition to the market leaders, smaller niche companies (like anime specialist Crunchyroll) show strength, while mid-tier models struggle. Regional platforms, including Canal+ (France), remain established in their local markets.[59]

A focus on productivity is pushing platforms toward bundling, ads, and selective AI. AI already powers personalization and is starting to support localization and content workflows. Rising costs and price-sensitive subscribers are driving stricter cost controls and reliance on ad tiers.[60] Looking ahead, rights-cleared generative AI video could lower production costs and shift value toward established brands; for example, Disney announced a deal with OpenAI that includes bringing Disney characters to Sora.[61]

By the numbers

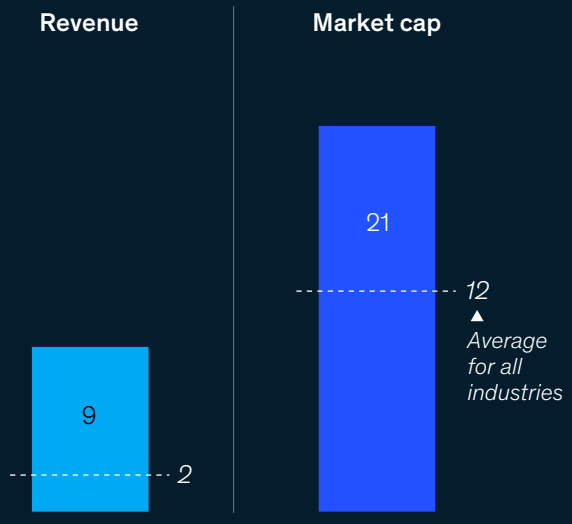
44%
of TV usage was broadcast and cable in 2025, down 20 percentage points since 2021[62]

200 billion
daily YouTube Shorts views in 2025, triple the 2024 total, underlining rapid growth of user-generated video[63]

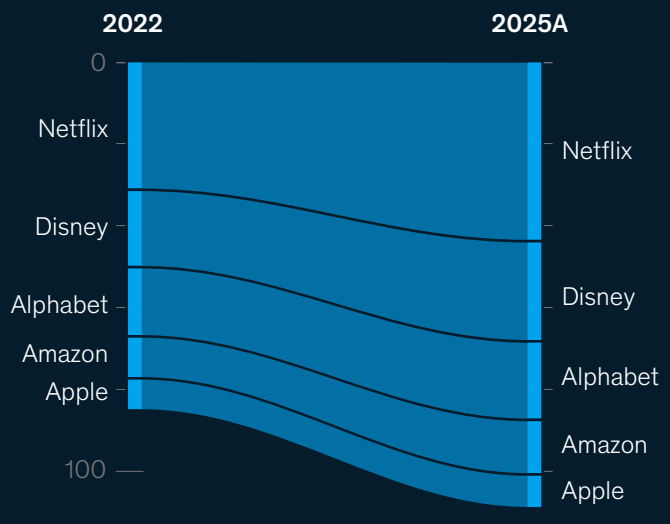
$95 billion
content spending by streaming services in 2025, up 6% since 2024[64]

7%
increase in premium subscription video on demand (SVOD) in the US in 2025, falling from a 12% increase in 2024[65]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. For Alphabet, only YouTube subscription revenue is included in this arena.

Cybersecurity

Companies that provide protection of digital systems—including networks, data, and users—from unintended and unauthorized access, modification, or destruction.

Arenas report revenue scenario for 2022–40

$0.6–1.2
2040 revenue scenarios, $ trillion

8–12%
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

Cybersecurity revenues are growing by about 13 percent a year. Company security budgets are rising as attacks rise, systems are moving to the cloud and software as a service, and regulations are widening their scope. AI adds a double tailwind—AI for security and security for AI. That helps lift cloud security, identity and access management, and security for AI CAGRs, with expectations of 15 percent and higher.[66] Investor confidence is strong; the industry's valuation is up roughly 20 percent as investors price in persistent digital risk.

The arena is still fragmented, but a few platforms are pulling ahead. Microsoft, Palo Alto Networks, and Fortinet remain at the top of industry revenue in our database, reflecting demand for integrated security suites. Cloud native CrowdStrike has emerged as one of the fastest-growing large cybersecurity vendors. And more capital is concentrating around scaled winners, supported by major deals such as Cisco's $28 billion purchase of AI-enabled cybersecurity and data analytics company Splunk.[67]

Increasing frequency and severity of attacks is lifting budgets. AI boosts attackers' capabilities and lowers their costs, driving more convincing phishing, faster payload delivery, and vulnerability discovery. At the same time, enterprise AI adoption widens companies' attack surface and creates demand both for tools that secure AI systems and for AI-enhanced defenses. In one 2025 survey, 97 percent of AI-related security breaches for corporations involved AI systems that lacked adequate AI access controls.[68] Tightening rules—including the EU's NIS2 directive, Singapore's strengthened regime, and state-by-state US regulations—are pushing organizations toward program-level cybersecurity investment.[69]

By the numbers

16%
of IT spending is expected to go toward cybersecurity by 2029, up from 12% in 2025[70]

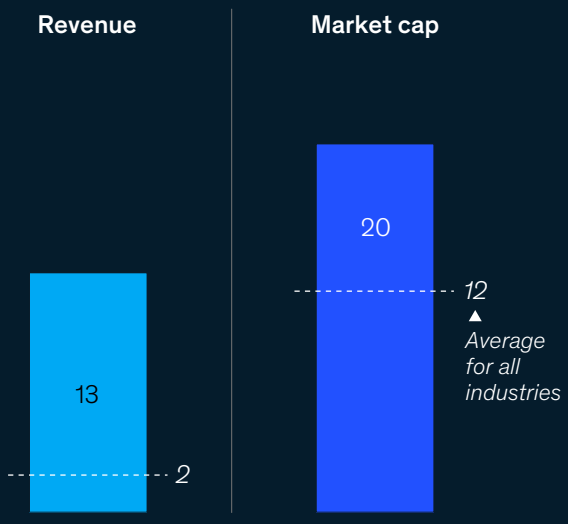
46%
year-on-year increase in ransomware incidents in 2025, with gen AI–related risks rising in parallel[71]

25%
annual growth in funding into cybersecurity in Q2 2025, with 8 rounds exceeding $100 million[72]

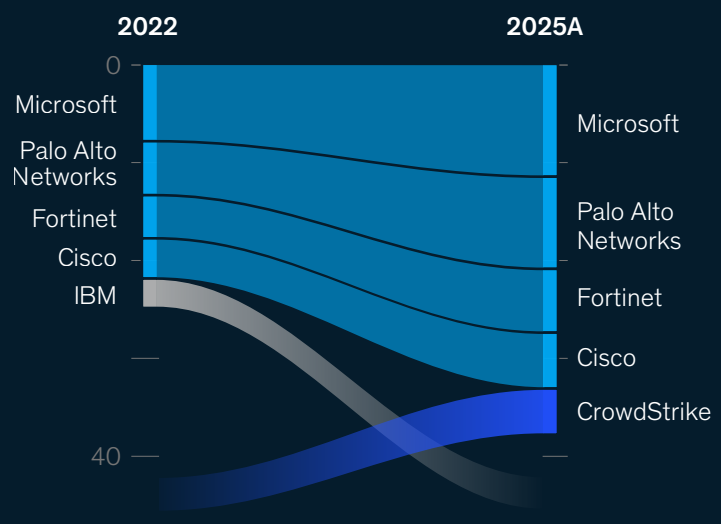
>90%
of companies have adopted cyber insurance in North America[73]

4 million
shortfall of cybersecurity professionals globally[74]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Microsoft in top player refers to Microsoft security platforms.

Video games

Producers and distributors of games played on dedicated consoles, PCs, and mobile devices.

Arenas report revenue scenario for 2022–40

$0.6–0.9
2040 revenue scenarios, $ trillion

5–8%
Annual growth, 2022–40, %

Status vs 2040 scenario

Lower bound of 2024 report

Global video-game revenues are tracking the lower scenario in our 2024 report, with mobile on a different path from console and PC. Mobile games and software revenues accounted for about 55 percent of 2024 revenue, up from 51 percent in 2019.[75] Mobile was the main growth engine, especially in emerging markets, as the console cycle aged, with a 25 percent decrease in US spending in 2024 versus 2023.[76]

Competitive dynamics diverge across platforms. For PC and console games, revenues are shifting from hardware toward online ecosystems that bundle multiplayer options, subscriptions, and live updates (for example, Xbox Game Pass, PlayStation Network/Plus, and Nintendo Switch Online). As cross-play becomes standard, accounts, social graphs, and content libraries reinforce platform-led ecosystems. Sony and Nintendo remain central console players, with Sony leaning into content, while Microsoft continues to experiment with cloud-enabled distribution. On mobile, publishers in the United States, Japan, Korea, and China lead, alongside user-generated-content platforms (such as Roblox). China remains one of the world's largest game markets, with about $45 billion in 2024 sales.[77]

As growth becomes harder to sustain and costs rise, the industry has shifted toward profitability. Live-service content represents about 40 percent of global gaming revenue, and advertising accounted for about one-quarter in 2024, increasing exposure to evolving privacy rules.[78] Facing escalating AAA development costs, publishers have pursued portfolio cuts as well as pilots of cloud and gen AI use cases. At the same time, franchise-led models are expanding across media, extending hit IP into film, television, and consumer products (as seen with *The Last of Us*). Transactions in 2025 underscore continued strategic activity in the sector, including the announced $55 billion acquisition of Electronic Arts by Saudi Arabia's Public Investment Fund (PIF), Silver Lake, and Affinity Partners.[79]

By the numbers

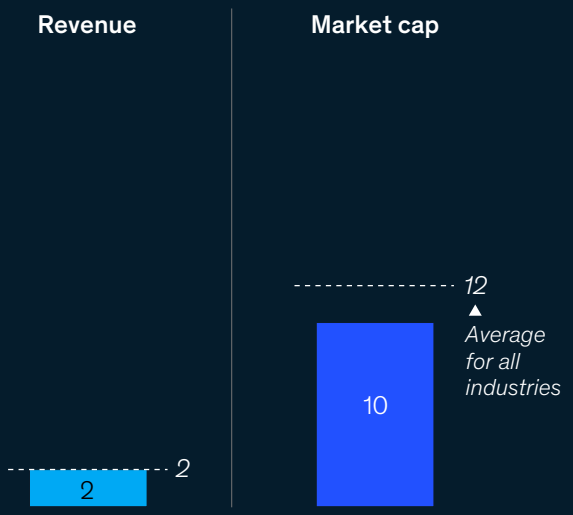
5%
annual growth in time spent on gaming in the US from 2019 to 2024, while time spent on media overall grew by only 1–2%[80]

>$45 billion
game revenues in China in 2024, with 670 million players, driven by mobile free-to-play as well as high-budget, high-profile "AAA" titles[81]

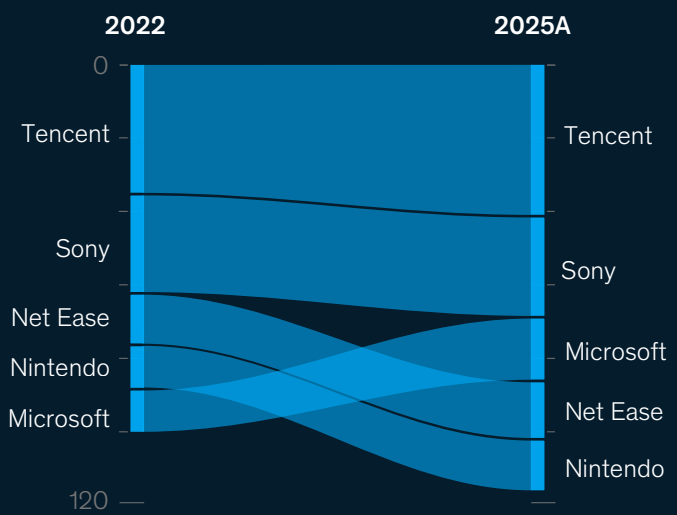
>$200 million
production budgets for AAA games today, driven largely by engineering and art costs, represent an eightfold increase since 2000[82]

>20% faster
R&D growth compared with revenue growth from 2019 to 2024[83]

Annual growth rate, 2022–25, %

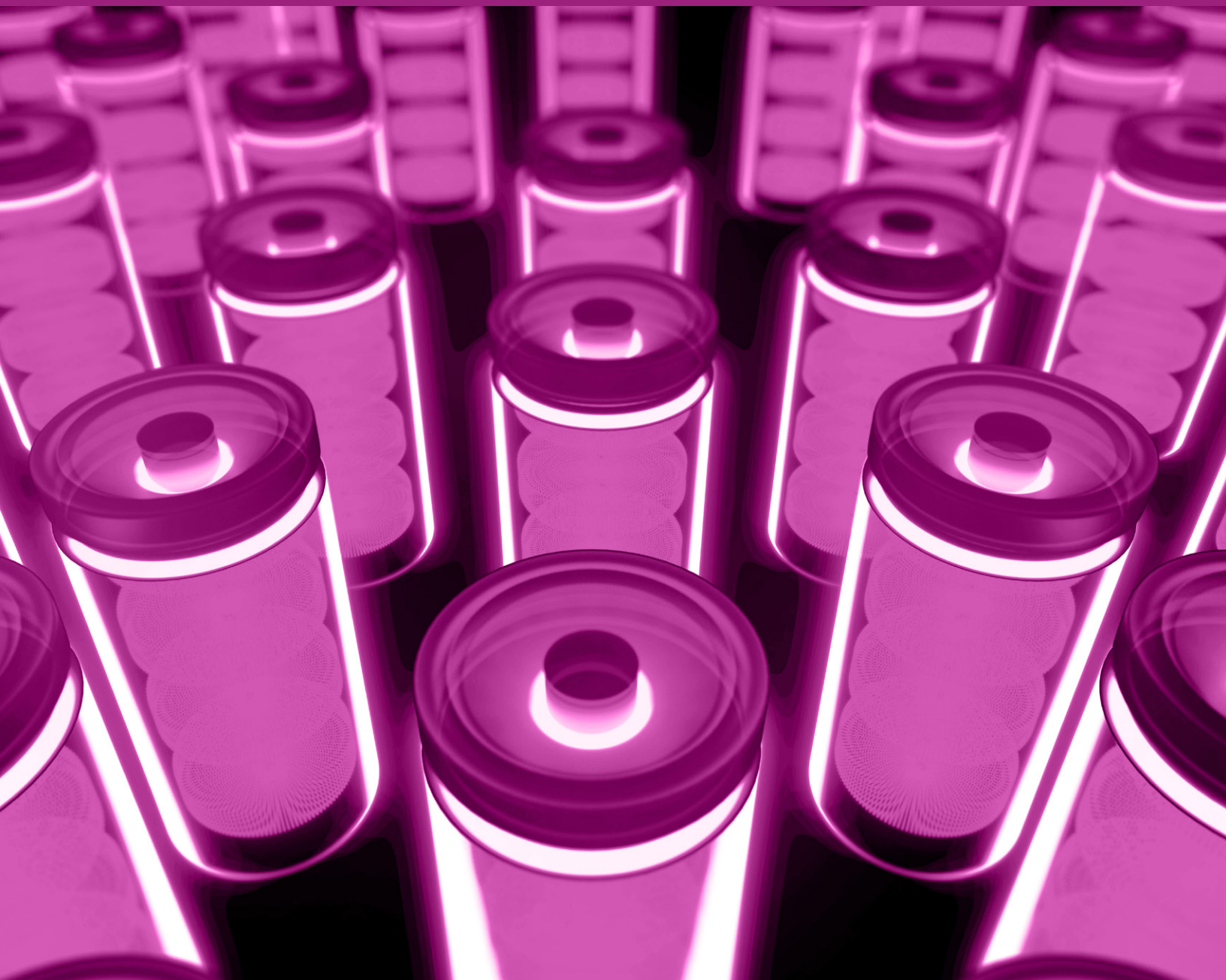


Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Revenue increase in Microsoft partially driven by acquisition of Activision Blizzard.

Electrification



Electric vehicles

Manufacturers of battery, plug-in hybrid, and extended-range electric vehicles.

Arenas report revenue scenario for 2022–40

$2.5–3.2
2040 revenue scenarios, $ trillion

10–12%
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

In electric vehicles (EVs), momentum diverges sharply by region.[84] China is pulling ahead, and in 2025, EV sales overtook internal combustion engines sales, accounting for 54 percent of passenger car sales.[85] Growth in the United States fell sharply after the expiration of EV tax credits, from a peak of 10 percent in September 2025 to less than 6 percent by year's end.[86] In Europe, the EV sales share stagnated for about two years but grew to 24 percent in mid-2025, and new targeted credits will start in 2026.[87] Emerging markets have accelerated. EV sales share rose to 35 percent in Vietnam, 26 percent in Thailand, and 8 percent in Brazil by mid-2025.[88] The EV mix is shifting toward hybrids; more than 60 percent of the roughly 700 models launching between 2026 and 2028 are hybrids, and several US and European OEMs (including Volkswagen, Ford, and Mercedes) scaled back fully electric targets.[89]

Chinese manufacturers are pulling ahead on scale, but price pressure and domestic competition are squeezing profitability. In 2025, more than 60 percent of global EV sales were in China, and BYD sold 40 percent more all-electric vehicles than Tesla.[90] Yet just a few leaders, like BYD and Li Auto, generated profits, while most Chinese OEMs recorded losses. US and EU incumbents also struggle to earn returns outside premium segments as EV costs—driven by smaller-scale supply chains, batteries, and overspecifications—remain higher than prices can absorb. Western players are partnering with Chinese EV and battery players to tap technology and platform synergies.[91]

EV technology and infrastructure have advanced. Battery pack prices dropped 30 percent in 2025, driven by raw material prices, and public charging reached new highs.[92] Charging is faster than ever before; the latest Chinese models can add 400 km in range with five minutes, about double 2023 levels.[93]

By the numbers

14.2 million
global EV sales in the first 3 quarters of 2025, up 25% over the same period in 2024 and more than double the level in 2022[94]

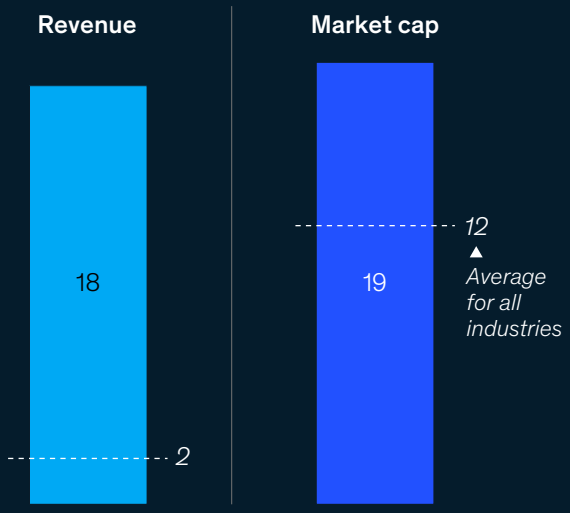
53 million
global stock of EVs as of Q3 2025, almost triple the stock of 2022 (18 million)[95]

2.4×
growth in number of EV models sold in 2025 (almost 280) compared to 2022 (just over 100)[96]

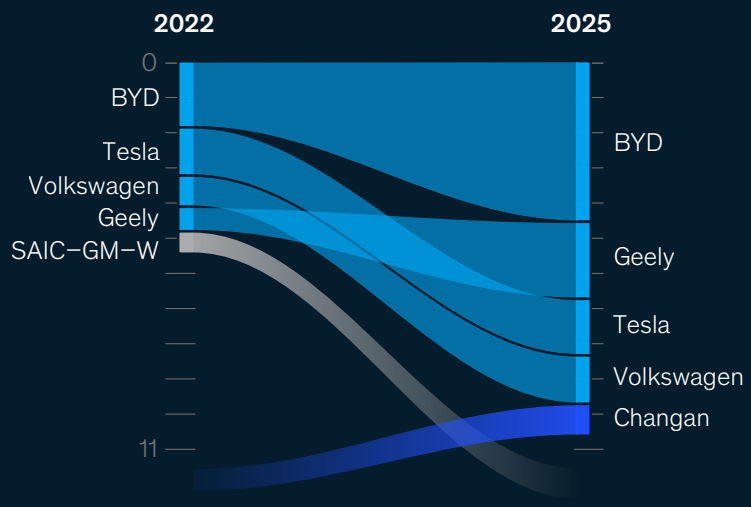
>100
models with >400-km range in 2025, 40% more than in 2024

2.7×
growth in public charging points installed in 2022–25 globally, rising to 7 million in 2025 (with two-thirds of them in China)[97]

Annual growth rate, 2022–25, %



Top 5 players, ranked by unit production volume, million



Note: Sources in the endnotes. Electric vehicles include battery electric vehicles, plug-in hybrid electric vehicles, and range extender electric vehicles. Source: S&P Global Mobility, Light Vehicle Production Forecast, February 2026

Batteries

Manufacturers of rechargeable lithium-ion batteries mostly used for EVs and battery energy storage systems that are mostly linked to electrification.

Arenas report revenue scenario for 2022–40

$0.8–1.1
2040 revenue scenarios, $ trillion

12–14%
Annual growth, 2022–40, %

Status vs 2040 scenario

Middle track of 2024 report

By 2025, lithium-ion battery volume demand had more than doubled over 2022 levels, reaching roughly 1.6 terawatt-hours (TWh).[98] EV battery demand—including nickel–manganese–cobalt and lithium–iron–phosphate (LFP) options— doubled between 2022 and 2025 (to 1.3 TWh). Accelerating momentum in battery energy storage solutions (BESS), whose demand tripled over the same period, contributed to fast battery volume demand growth, especially for LFP chemistries.[99] Hyperscalers' investments, including multi-GW solar-plus-storage deals signed by Microsoft, Alphabet, and Meta, have supported BESS growth in the United States and Europe, with rising AI-related demand expected to continue.[100]

Despite strong volume surges, revenue growth has been tempered by lower battery prices. Battery prices dropped by roughly 30 percent in China and by 10 to 15 percent in Europe and the United States in 2024 as manufacturing overcapacity coincided with falling raw-material prices.[101] Shifts in battery chemistry also contributed as lower-cost LFP batteries displaced higher-cost nickel–manganese–cobalt batteries, following OEMs' preferences.

China leads in battery manufacturing, with 85 percent of global capacity.[102] China's advantages include an early focus on LFP batteries, preferred access to refined raw materials (about 70 percent market share of global critical mineral refining), a competitive battery components ecosystem, and higher integration with EV end-markets.[103] Meanwhile, several European and US battery projects were stalled or cancelled after 2022. US battery demand may slow further following policy changes and reduced subsidies in 2025.[104] At the same time, emerging economies with critical mineral reserves are expanding their roles in the value chain. Morocco is attracting billion-dollar investments across the battery value chain, while Indonesia and Vietnam are partnering with Chinese and Korean players such as CATL, LG Energy Solution, and Gotion High-Tech.[105]

By the numbers

3×
global installed manufacturing capacity increase from 2022 to 2025 (to 3.8 TWh)[106]

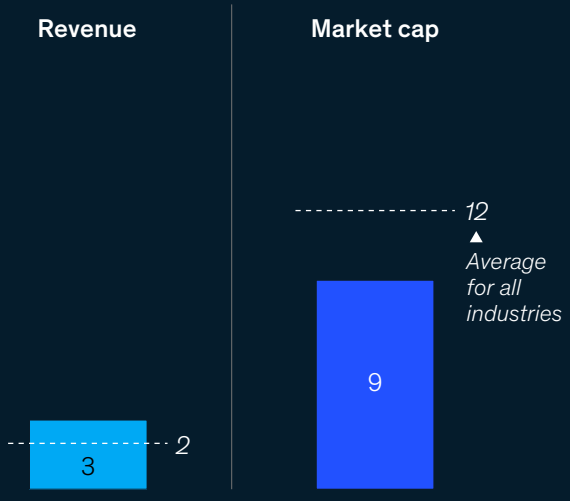
$65 billion
global investment in battery storage in 2025, >3x the level in 2022[107]

50%
share of LFP chemistry in EV batteries in 2025, >10 percentage points more than in 2022[108]

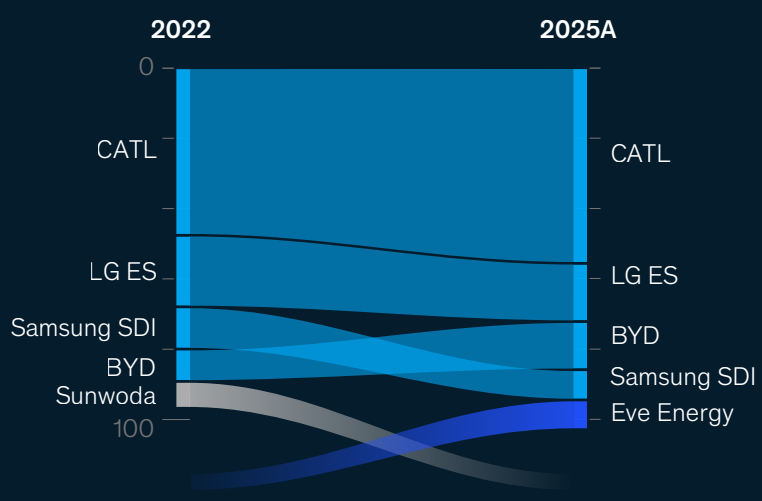
>50
battery manufacturing projects canceled or delayed between 2022 and 2025 in the US and Europe[109]

>30%
year-on-year decline in global price of turnkey battery energy storage systems in 2025[110]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. LG ES stands for LG Energy Solution.

Nuclear fission

Players that construct nuclear fission power generation facilities.

Arenas report revenue scenario for 2022–40

$65–150
2040 revenue scenarios, $ billion

7–13%
Annual growth, 2022–40, %

Status vs 2040 scenario

Lower bound of 2024 report

While nuclear fission is adding modest new power capacity today, momentum is growing. Limited new nuclear capacity has come online since 2022, mostly in Asia, including seven reactors in China (adding about eight gigawatts, or GW) and two in South Korea (adding roughly three GW). Notably, since 2022, the European Union began adding new build capacity to its grids for the first time in decades.[111] By the end of 2025, roughly 70 reactors were under construction worldwide (about 70 GW), more than half of them in China.[112]

Policy momentum and corporate demand are strengthening, driven by the need for firm, low-carbon power and accelerated by growing AI data-center loads. Thirty-three countries have signed on to support tripling global nuclear capacity by 2050, up from 25 at COP28 in 2023.[113] In 2025, the US government launched initiatives to streamline licensing for advanced designs, including for small modular reactors (SMRs).[114] Large buyers are engaging with nuclear power, too: Microsoft, Meta, and Alphabet signed long-term agreements with nuclear players to supply clean, firm power for AI data centers.[115]

SMRs are moving from concepts toward early deployment. SMRs could create opportunities for new entrants if they deliver on their potential for lower costs and faster builds. Two SMRs operate today (in Russia and China), and about 25 designs are under construction or in licensing phases.[116] Those projects include sites in Canada, China, Russia, and the United States, with roughly $15 billion secured for SMR development as of early 2025.[117] Research is advancing on even smaller nuclear microreactors that are compact enough to be fully built in a factory and easily transported.

By the numbers

23 gigawatts
capacity connected to the grid between 2022 and 2025 while 15 GW was retired, increasing global capacity by 2% from 370 GW in 2022[118]

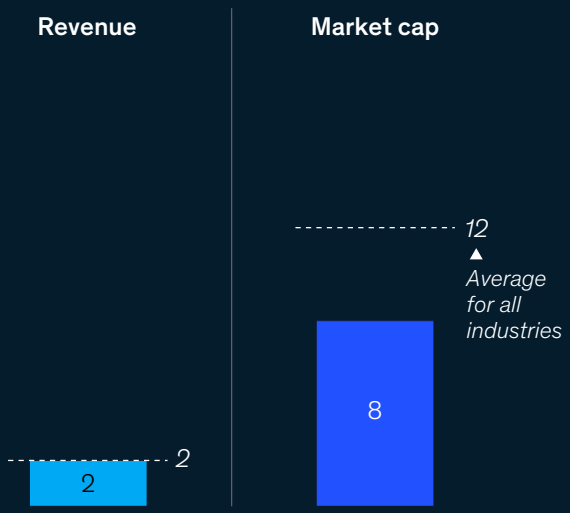
>70 gigawatts
from about 70 reactors are currently under construction, more than half in China[119]

9.6 years
average construction time of the 7 nuclear plants that became operational in 2024[120]

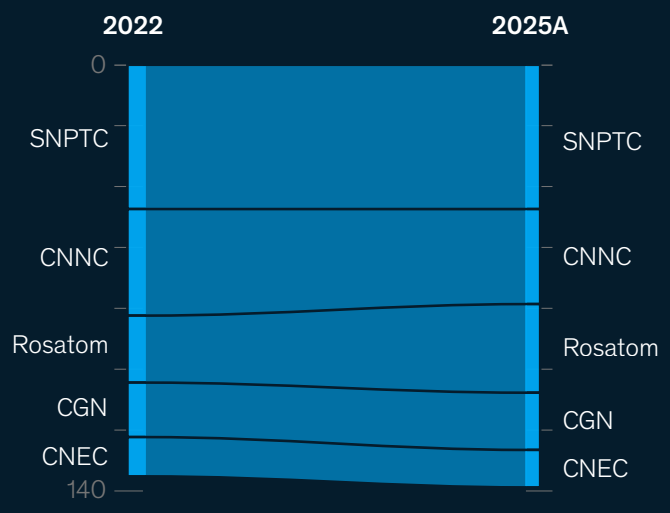
$70 billion
global 2025 investment in nuclear, a roughly 50% increase over 5 years but still a sliver of total power-sector investment of $1.5 trillion[121]

2 SMRs
in operation as of 2025, in Russia and China[122]

Annual growth rate, 2022–25, %

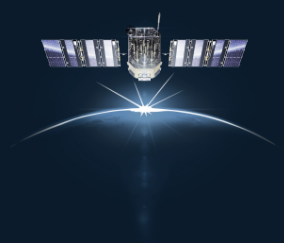


Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. SNPTC stands for State Nuclear Power Technology Corporation (China), CNNC stands for China National Nuclear Corporation, Rosatom stands for State Atomic Energy Corporation Rosatom, CGN stands for China General Nuclear Power Group, and CNEC stands for China Nuclear Engineering Corporation.

Hard tech



Space

Companies that sell satellites, launchers, services such as satellite TV, GPS, and applications with revenues that are directly attributable to space hardware and service providers.

Arenas report revenue scenario for 2022–40

$1.0–1.6
2040 revenue scenarios, $ trillion

7–10%
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

Commercial activity is expanding, and new competition is shifting the landscape.[123] Growth is driven by reusable-rocket technology, defense-related demand, low-Earth-orbit satellite constellations (such as Starlink), and new uses for Earth-observation data and analytics. SpaceX advanced to first in revenues, while institutional spending is mostly going to defense primes like Lockheed Martin, Northrop Grumman, and Airbus. Smaller "new space" players have gained momentum and seen valuations surge. For instance, Rocket Lab's market cap rose more than 20-fold between 2022 and 2025.[124]

Launch costs are falling, enabling new services. In the US, SpaceX's partial reusability with Falcon 9 has already driven a step change versus legacy launch economics (down roughly 90 percent compared with the space shuttle era), and SpaceX's fully reusable Starship would push costs down further.[125] In Europe, next-generation heavy-lift rocket Ariane 6 entered commercial service in 2025.[126] Direct-to-device connectivity services—like T-Mobile's T-Satellite service, powered by Starlink—are active, while in-orbit data centers and other formerly futuristic concepts are being actively explored.[127]

Regional activity is rising, and markets are clustering around a few anchor platforms. Europe is advancing defense-linked initiatives, including Germany's €35 billion space-related investment through 2030 and the European Sky Shield initiative.[128] The United States is mobilizing multibillion-dollar defense funding, including a plan for $175 billion over the next three years for the "Golden Dome" missile-defense concept; India and China are advancing space programs, including lunar missions.[129] Government-led missions and new procurement models are scaling commercial space capabilities. SpaceX, United Launch Alliance, and Blue Origin were chosen for the US national-security launch program for 2027–32, and in Europe, major satellite players are planning to merge in a joint venture called Project Bromo.[130]

By the numbers

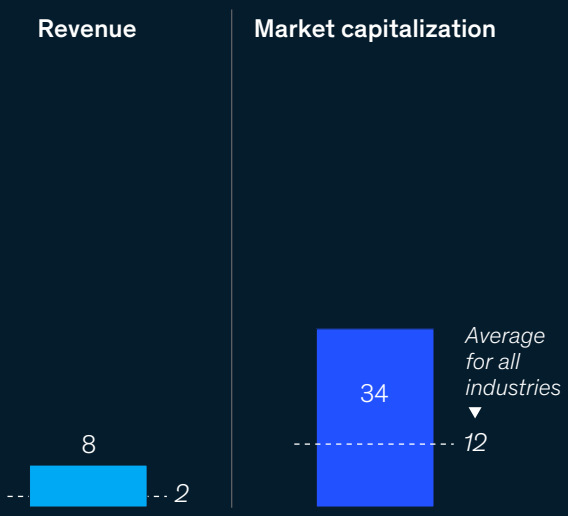
28 hours
average time between orbital launches in H1 2025, 6 hours faster than the annual record set in 2024[131]

10–15×
potential reduction in launch cost per kg to low Earth orbit that SpaceX's Starship could deliver vs Falcon 9[132]

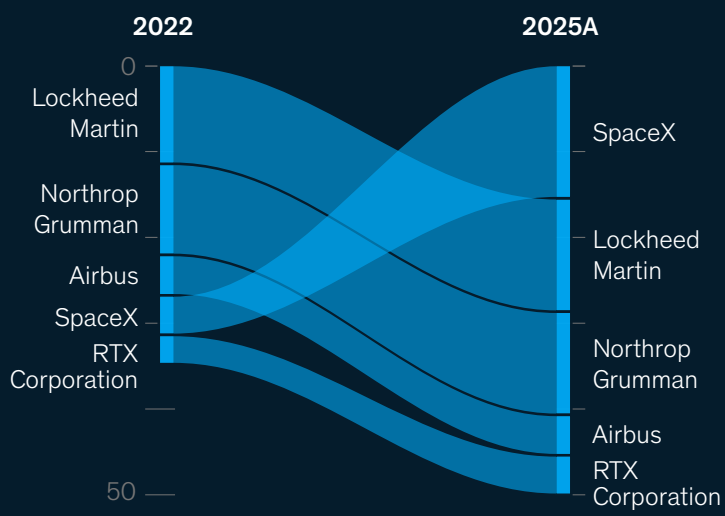
$37 billion
allocated US federal funding to start the Golden Dome, a national missile-defense shield, with full cost estimates from $175 billion to $3.6 trillion[133]

€22 billion
European Space Agency budget secured for 2026–28, a 30% increase compared with the 2022–25 budget[134]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3.

Robotics

Manufacturers of robots and providers of robotics solutions.

Arenas report revenue scenario for 2022–40

$190–910
2040 pool, $ billion

13–23%
Annual growth, 2022–40, %

Status vs 2040 scenario

Middle track of 2024 report

Robotics is growing on two tracks. Industrial robots are mature, and their ROI is proven. Humanoid and other general-purpose robots, meanwhile, are moving rapidly from pilots to early deployments. While industrial incumbents like ABB, Fanuc, and Kuka still account for most revenues, recent capital allocation has shifted sharply toward AI-native and humanoid-focused companies. For example, humanoid robot company Figure AI reached a $39 billion valuation in 2025.[135] M&A is accelerating. ABB acquired AI-focused Sevensense Robotics in 2024, and in 2025, Softbank agreed to acquire ABB's robotics division for $5.4 billion.[136]

Competition is shifting by region and supplier mix. China accounted for roughly half of new industrial robot deployments in 2024 and is rapidly localizing supply. Nearly 60 percent of 2024 installations were domestically produced, up from less than 30 percent a decade earlier, challenging Japanese and European incumbents.[137] China also has an active humanoid-robotics ecosystem, with robust investments into training data.[138] However, most humanoid robots are used for demonstrations or entertainment, with commercial use cases still in early phases.

Technological progress is accelerating, especially in humanoid robotics. In 2023, DeepMind's RT-2 pioneered "vision–language–action" models that map robot actions into a transformer pretrained on large amounts of text and image data, improving generalization across tasks.[139] Building on this, researchers are developing "robot foundation models" to generalize across tasks, environments, and robot-form factors. Improvements are happening in actuation hardware, dexterous manipulation (hand skills), batteries, and multimodal perception alongside simulation-based training and large-scale teleoperation data pipelines. While these capabilities are accelerating, adoption of general-purpose robots remains mostly limited to pilot programs and research deployments.[140]

By the numbers

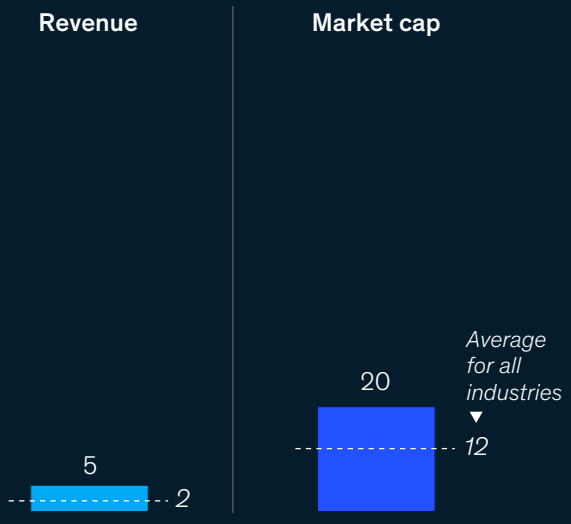
40%
reduction in per-unit manufacturing costs of humanoid robots in 2024 compared with the previous year[141]

1.6 million
industrial robots installed globally between 2022 and 2024, including 540,000 in 2024[142]

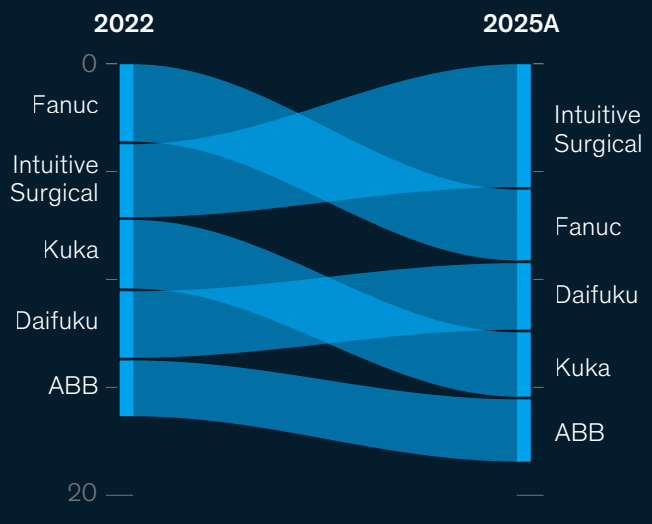
$6 billion
funding into robotics start-ups in H1 2025, about 80% of the total raised in all of 2024[143]

$5.4 billion
SoftBank's agreed price to acquire ABB's robotics division in 2025[144]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



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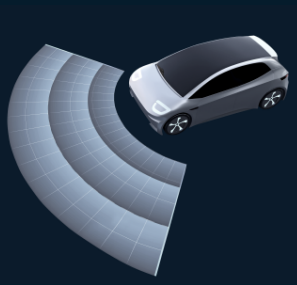


Shared autonomous vehicles

Operators of shared autonomous vehicle services.

Arenas report revenue scenario for 2022–40

$0.6–2.3
2040 revenue scenarios, $ trillion

N/A
Annual growth, 2022–40, %

Status vs 2040 scenario

Upper bound of 2024 report

Shared autonomous vehicles (SAVs) are moving quickly from pilots to scaling phases, with operations and testing in more than 30 cities in the United States, China, and the UAE.[145] Millions of rides in robotaxis have helped prove that the technology is capable of serving everyday urban transportation needs.

A few early leaders are ahead of the pack, but partnerships are accelerating and new entrants are lining up. In the United States, Waymo leads, while Uber and Lyft are continuing to operate ridesharing marketplaces for human drivers and robotaxis while exploring participation via partnerships.[146] Tesla plans to scale robotaxis in 2026, and Amazon-owned Zoox is also pushing toward commercialization with a purpose-built robotaxi.[147] In the Middle East, Uber has partnered with Pony.ai.[148] In all markets, uptake has tracked closely to the regulatory environment. In China, policy frameworks have cleared the way for local players like Apollo Go and Pony.ai to expand. In the United States, each state and city has its own regulatory approval processes; some allow rapid scale-up, while others are more cautious.[149]

SAV economics remain challenging, despite rapid growth and strong signals of customers' willingness to pay. Waymo's per-mile pricing is estimated to be about 30 percent higher than the cost for a human-driven UberX ride in San Francisco, for example.[150] Yet most robotaxi services operate at a loss; our analysis shows revenues may be about $2 per mile, while operating costs can exceed $8 per vehicle mile.[151] High sensor costs, fixed costs for city launches, and fleet operations account for the gap.[152] Leading players have yet to turn a profit and have expressed hope that falling hardware costs and higher utilization will improve unit economics. For example, Apollo Go reported cutting vehicle production costs by 60 percent from its prior model.[153]

By the numbers

>30
cities with SAV commercial operations or testing as of 2025

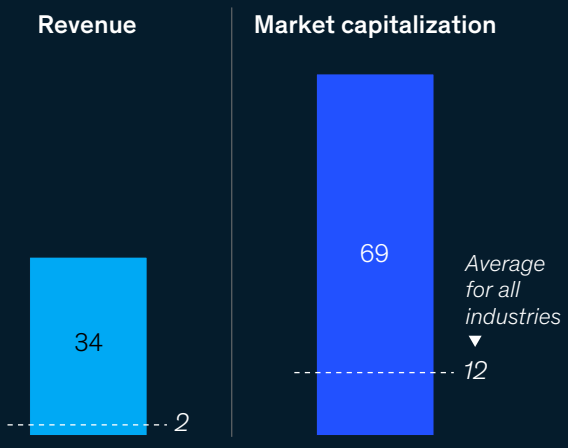
25×
growth in number of rides per week reported by Waymo between 2023 and 2025[154]

60%
vehicle cost reduction reported by Apollo Go in 2024 for its RT6 model, compared to 2021 Apollo Moon (from $75,000 to about $30,000 per vehicle)[155]

1
city where Apollo Go claims profitable operations (Wuhan, China)[156]

53%
share of survey respondents who stated that safety concerns were a major roadblock to more widespread autonomous vehicle adoption in 2024[157]

Annual growth rate, 2022–25, %



Players operating commercially in shared autonomous vehicles by the end of 2025

- Waymo *(Alphabet)*
- Apollo Go *(Baidu)*
- WeRide
- Pony.ai

Note: Players with fleets of at least 500 vehicles by end of 2025. Revenue growth measured vs 2023 due to negligible 2022 baseline revenue.

Future Air Mobility

Operators of air mobility transport services, such as eVTOLs and delivery drones.

Arenas report revenue scenario for 2022–40

$75–340
2040 revenue scenarios, $ billion

N/A
Annual growth, 2022–40, %

Status vs 2040 scenario

Lower bound of 2024 report

Future air mobility is progressing, although at different speeds for commercial drones and electric vertical take-off and landing (eVTOL) aircraft. Drone logistics is in growth mode. For example, Zipline reported two million commercial deliveries in January 2026, doubling from one million in April 2024.[158] Deployments are expanding in retail and medical delivery, particularly in Africa and the United States, with operations across dozens of cities.[159]

By contrast, eVTOLs remain largely in certification and precommercial flight testing.[160] Leading developers like Joby, Archer, and EHang are advancing type certification and pilot programs.[161] EHang has received type certification in China (meaning the aircraft design meets requirements for remotely piloted, human-carrying eVTOLs), and has plans to begin commercial launches in select Middle Eastern markets.[162] Investment in eVTOLs between 2022 and 2025 was about $11 billion (and growing 14 percent each year), accounting for roughly 60 percent of total funding in the future air mobility arena for the period.[163]

Scaling in both segments will depend on unit economics, battery performance, and regulatory pathways. Profitability hinges on achieving high utilization rates on dense routes, so that frequent flights can amortize substantial fixed costs for hardware, infrastructure, R&D, and compliance. Continued battery improvements—in energy density, cycle life, and charging efficiency—are critical to expanding range and flight frequency. At the same time, certification complexity and operational approval frameworks remain gating factors for broader drone and eVTOL commercialization.

By the numbers

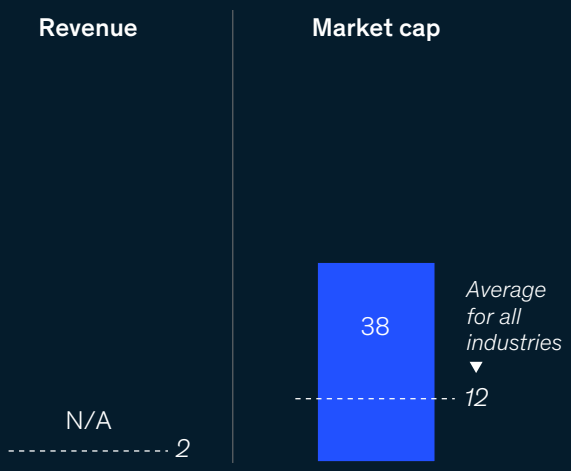
$18 billion
funding toward future air mobility in 2022–25, 50% more than in the prior 4 years[164]

28,000
eVTOL aircraft orders as of 2025, including >6,000 in 2025 alone[165]

250–300 Wh/kg
energy density of current commercial lithium-ion batteries used in future air mobility[166]

<5 pounds
2.3 kg) typical payload capacity of current small-parcel urban delivery drones[167]

Annual growth rate, 2022–25, %



Top players

eVTOLs, by 2025 market value	**Drones,** by completed deliveries as of 2025
Archer Aviation	Zipline
BETA Technologies	Wing
Joby Aviation	Meituan
EHang	Manna Drones
Eve Air Mobility	Flytrex Aviation

Note: Sources in the endnotes. Market value estimated based on publicly reported valuations. Revenues are not reported, due to drone players being private and eVTOL players pre-revenue.

Modular construction

Companies that operate in the modular construction value chain from design to assembly, including both 2D and 3D structures.

Arenas report revenue scenario for 2022–40

$0.5–1.1
2040 revenue scenarios, $ trillion

6–10%
Annual growth, 2022–40, %

Status vs 2040 scenario

Lower bound of 2024 report

Modular construction continues to expand as it compresses timelines and improves productivity. From 2022 to 2025, the modular construction market grew modestly, even as residential construction, where modular activity tends to be concentrated, fell about 12 percent, driven by residential construction declines in China and slower US growth.[168] Adoption is strongest in standardized asset classes, such as multifamily housing, student housing, hotels, and schools. Public-sector procurement has also supported uptake, with recent projects in the United States and Singapore requiring off-site methods of construction.[169] New demand could come from data centers, where an estimated 40 to 85 percent of components could be delivered through modular or other prefabricated solutions.[170]

The competitive landscape is fragmented. Advantage is shifting to players that combine in-house manufacturing with on-site assembly using repeatable building systems. These vertically integrated firms can earn 15 to 20 percent EBITDA margins, versus about 5 percent for manufacturers that do not control downstream integration and installation. That said, integration can potentially increase capital needs and risk profiles by pushing the model toward project delivery.[171]

Technology, capital, and regulation are gradually improving scalability. Progress varies by region. Design for manufacture and assembly, building information modeling (BIM), and digital-twin workflows are enabling more repeatability and cost control. In the United States, updated regulatory agency standards support off-site construction.[172] In Europe, new construction-product rules and Digital Product Passport frameworks favor standardized, well-documented modules.[173] In many emerging markets, high capital costs, logistics constraints, and fragmented building codes continue to limit scale, suggesting steady, regulation-enabled growth rather than rapid disruption.[174]

By the numbers

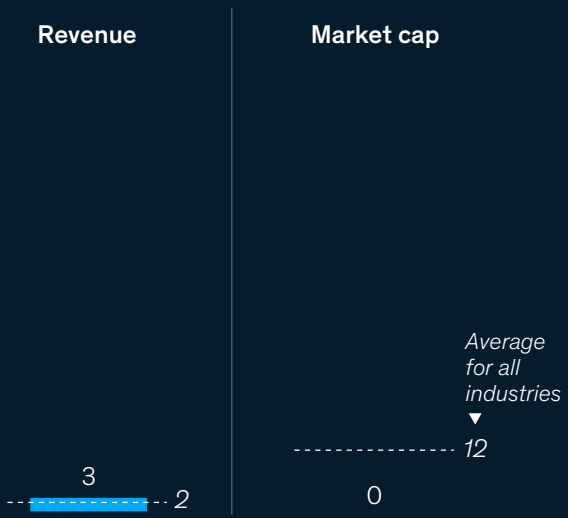
60–70%
of modular construction players generate <€50 million in revenues[175]

>60%
of modular firms are local only; some are regional; only about 15% have a global footprint[176]

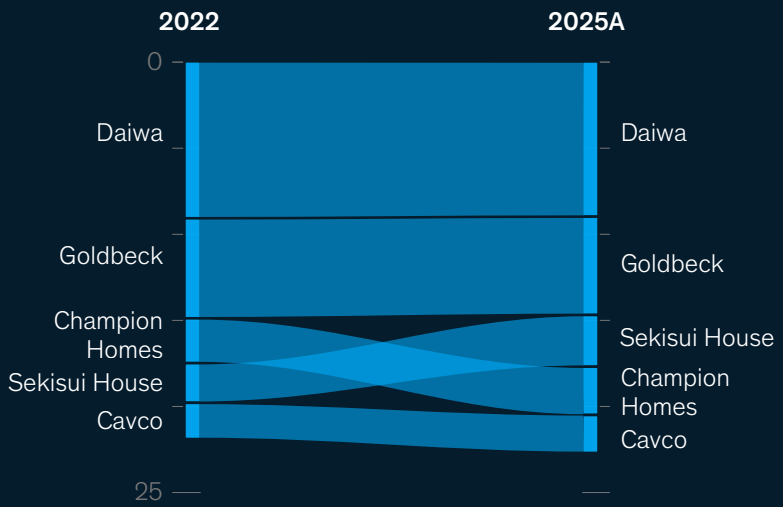
≤50%
project delivery acceleration enabled by modular construction methods[177]

80%
reduction in material waste generated by modular projects compared with conventional construction in a set of case studies[178]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Note: Sources in the endnotes. Estimates based on 10K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Modular revenue figures are directional, as they are not reported as a separate segment. Rankings may exclude companies where modular revenues are highly ambiguous.

New bio-frontiers

Obesity drugs

Companies that sell GLP-1s and other drug therapies for obesity and related conditions, such as diabetes.

Arenas report revenue scenario for 2022–40

$120–280
2040 revenue scenarios, $ billion

9–15%
Annual growth, 2022–40, %

Status vs 2040 scenario

Middle track of 2024 report

Novel weight-loss therapies are scaling rapidly. In the United States, prescriptions rose sixfold in five years, and out-of-pocket demand doubled in some European countries.[179] Yet the therapies are prescribed to just a small portion of eligible populations, and affordability limits accessibility for some. As patents expire in some countries, lower-cost alternatives could broaden access.

Innovative formulations could unlock the next phase of demand. Oral alternatives to traditional injections are advancing. The first GLP-1 pill for weight loss received US regulatory approval in December 2025.[180] Longer-acting regimens and other formulations that are nearing launch could reduce treatment burdens and broaden the customer base.

Competition is rising even as the market stays concentrated. As of 2025, Novo Nordisk and Eli Lilly are the only two companies providing GLP-1 therapies for obesity on a global scale. But more than 80 companies are pursuing obesity drugs, and the field is likely to be more crowded five years from now. Several major pharmaceutical companies, including Boehringer Ingelheim and Amgen, have announced Phase III trial entries.[181] Entrants are investing via M&A and differentiated technologies, and incumbents are responding with pricing and new commercial models, such as the direct-to-patient channels LillyDirect and NovoCare. The dynamism of the market manifested in volatile valuations between 2022 and 2025. Although Novo Nordisk was at some points during this period Europe's largest company by market cap, since 2024 it has lost significant market share in obesity drugs to Eli Lilly as supply constraints eased and investors reassessed pricing dynamics and the competitive outlook for next-generation therapies.[182]

By the numbers

6.5%
of all US prescriptions were for GLP-1 drugs in September 2025, up from roughly 1% in 2020

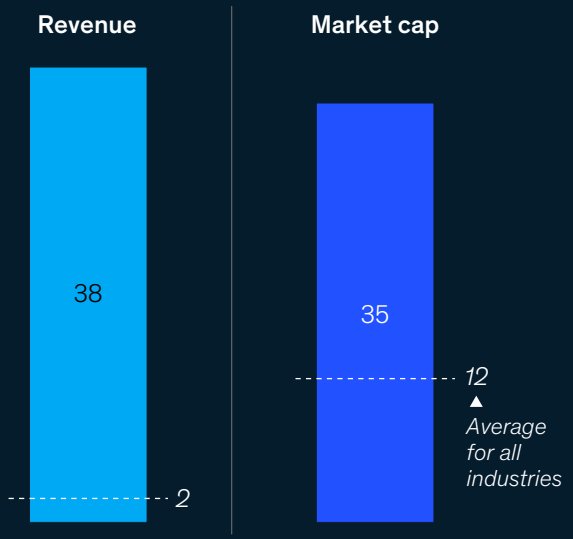
3%
of eligible US adults received a prescription for weight-loss medications as of 2024[183]

≥80
approximate number of players developing obesity drugs, up from 50–60 in 2022[184]

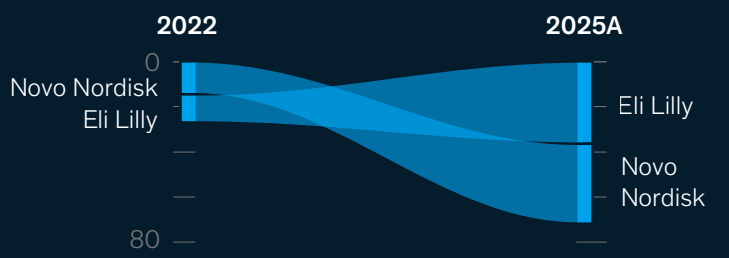
25–40%
estimated net price reduction for commercial market obesity drugs in the US between 2022 and 2025[185]

>$20 billion
announced investment from 4 players to scale manufacturing capacity of obesity drugs[186]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources



Additional large pharmaceutical companies with late-stage assets

- Amgen
- AstraZeneca
- Boehringer Ingelheim
- Pfizer
- Roche

Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. Only GLP-1 drugs are considered.

Non-medical biotech

Providers of biotechnology-enabled products in agriculture, alternative proteins, biomaterials and biochemicals, and consumer products markets.

Arenas report revenue scenario for 2022–40

$340–900
2040 revenue scenarios, $ billion

5–11%
Annual growth, 2022–40, %

Status vs 2040 scenario

Lower bound of 2024 report

Growth in the non-medical biotech arena has been limited since 2022. We analyze four significant biotech segments for this arena: agricultural biotech, alternative proteins, biomaterials and biochemicals, and consumer products and services. Despite many promising scientific advances, bio-based alternatives still need to outperform conventional options in order to scale. As of 2026, the gains in yields, throughput, and unit economics have generally not been enough for broad commercial competitiveness.[187] For example, cultivated meat and precision fermentation show promise but have been slow to take off.[188] Leading bio-based materials, such as bioplastics, also remain far from mass-market scale at less than 1 percent of global packaging.[189]

The competitive landscape is fragmented. Incumbents in agri-food chemicals and biotechnology—including ADM, Bayer, and Corteva—lead the market, alongside a long tail of venture-backed specialists in alternative proteins, precision fermentation, and specialty biomolecules. Pure players are still limited across the four segments. In some fields, barriers to entry can be high, requiring, for example, secure feedstocks, deep engineering know-how, and capital-intensive manufacturing infrastructure.

Of the four segments, agricultural biotech has the strongest momentum, while alternative proteins and biomaterials are innovating quickly but remain subscale. Demand for resource-efficient, climate-resilient crops is boosting commitments in agricultural biotech. For instance, by 2024 Bayer had more than 15 biological projects in its pipeline.[190] Syngenta is expanding its biologicals portfolio.[191] Policy reforms are speeding approvals for gene-edited crops in India (rice) and China (multiple crops, including soybeans, wheat, and rice), potentially unlocking demand in multibillion-dollar markets.[192]

By the numbers

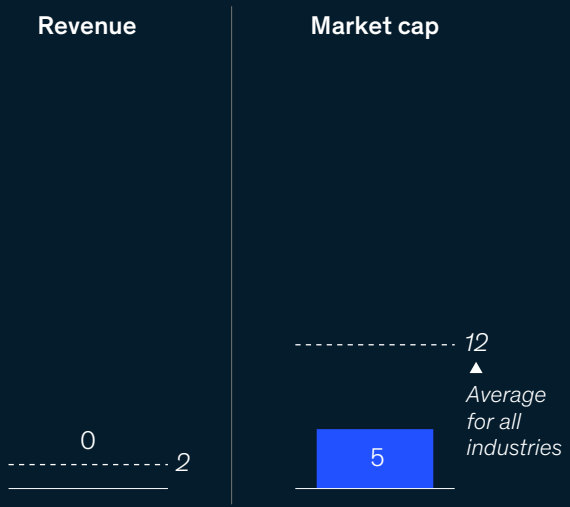
–10%
change in number of patent filings for cultivated meat, from 125 patents in 2022 to 113 in 2023[193]

2×
increase in M&A deals (>90) involving companies focusing on biologicals globally in 2022–25 compared to the prior 4 years[194]

46
facilities launched, expanded, or announced in 2024 for alternative-protein production globally, almost 3x the 2023 total[195]

65
patents (granted and forthcoming) related to the use of CRISPR gene-editing technology to modify crops in the US in 2024[196]

Annual growth rate, 2022–25, %



Top 5 players, ranked by revenue estimated from public sources

Note: Sources in the endnotes. Estimates based on 10-K reports, $ billion. 2025A data has been annualized based on 2025 quarterly data available as of publication, with most companies reporting through Q3. ADM stands for Archer-Daniels-Midland (ADM).

Acknowledgments

The research was led by Kevin Russell, an MGI senior fellow in the Raleigh office; Chris Bradley, McKinsey Global Institute director and senior partner in the Sydney office; Naveen Sastry, senior partner in the Bay Area office; Suhayl Chettih, an MGI fellow in the New York office; Kweilin Ellingrud, MGI director and senior partner in Minneapolis; and Natalya Goryunova, a consultant in the Helsinki office.

Natalya Goryunova and Fulvio Ferretti led the working team, which included Aksel Hermanson, Arnold Ogbogu, Haikun Liu, Noshin Nova, Prateek Kabra, and Sofia Melloni. This article was edited by MGI senior editor, Cintra Scott, with data visualizations by Laura M. Mandujano and Chuck Burke.

Many McKinsey and MGI colleagues provided critical input. We thank Aamanh Sehdev, Alexandre van de Rijt, Alizée Acket-Goemaere, Anna Kortis, Ani Kelkar, Antoine Montard, Arvind Govindarajan, Bill Wiseman, Brooke Stokes, Chad Cramer, Charlie Lewis, Christian Ahrberg, Corina Curschellas, Crys Wright, Dago Diedrich, Dale Swartz, Daniel Riefer, Dave Dauphinais, David Fiocco, Deston Barger, Eric Kutcher, Erik Sjödin, Erlend Spets, Gayatri Shenai, Giacomo Gatto, Jakob Fleischmann, Jan Mischke, Jan Paulitschek, Jeffrey Caso, Jeongmin Seong, Jochen Latz, Jon Ng, Jordan Bank, Josh Sternberg, Kabir Ahuja, Karel Eloot, Kasia Iskra, Keenan Weaving, Kevin Wei Wang, Klaus Pototzky, Konstantin Wirth, Lars Hartenstein, Lauritz Fischer, Lei Xu, Lia Grigg, Marc Brodherson, Masud Ally, Mateusz A. Lesniak, Michael Birshan, Michael Chui, Moritz Rittstieg, Olivia White, Omar Kaakani, Patrick Schaufuss, Russell Hensley, Ryan Brukardt, Shubham Singhal, Stefan Burghardt, Sven Smit, Tim Koller, Timo Möller, Ting Wu, Tom Brennan, Tore Johnston, Whitney Zimmerman, and Yunjing Kinzel for their insights and guidance.

We are especially grateful for the contributions of MGI senior advisers: Matthew Slaughter, Paul Danos Dean of the Tuck School of Business and the Earl C. Daum 1924 Professor of International Business, Dartmouth College; and Chris Miller, author of *Chip War: The Fight for the World's Most Critical Technology*, professor at the Fletcher School of Tufts University, and a nonresident senior fellow at the American Enterprise Institute.

In MGI's publishing team, we would like to thank editorial director Rachel Robinson and assistant managing editor Rishabh Chaturvedi. In communications, Cathy Gui, Nienke Beuwer, Rebeca Robboy, and Suzanne Albert. Thanks also go to McKinsey's design team, especially Diane Rice, Janet Michaud, Nathan R. Wilson, Sean M. Conrad, and Stephen Landau. We are also grateful for the collaboration of Mary Gayen in McKinsey's digital production team.

As with all MGI research, this work is independent and has not been commissioned or sponsored in any way by any business, government, or other institution. We seek to provide business and policy leaders with the facts and insights needed to better understand the forces shaping the global economy. Any errors are our own.

Endnotes

Introduction

1 The same analysis was rerun for 2005–23, and the same 12 industries had the highest growth and dynamism. See "Capturing the next big arenas of competition in 10 charts," McKinsey Global Institute, November 20, 2025.

2 Where the context is clear, we also refer to future arenas as simply "arenas." While we discuss other industries that could become arenas in the period through 2040, we did not revisit the 2024 report's "arenas" designations by modeling them to 2040.

3 We use 2022 as the baseline year because our analysis of the 18 future arenas in the original 2024 report and the market sizing for each arena used 2022 as the starting point. The main patterns are robust to shifting the baseline to 2021 or 2023 (as suggested by the area charts); while pandemic-era effects may influence some levels and near-term growth rates, they do not materially change the overall conclusions.

Executive summary

4 The same analysis was rerun for 2005–23, and the same 12 industries had the highest growth and dynamism. See "Capturing the next big arenas of competition in 10 charts," McKinsey Global Institute, November 20, 2025.

5 For 2040 scenario details, see *The next big arenas of competition*, McKinsey Global Institute, October 23, 2024.

6 Omniscalers are all in the global top 30 for combined spend on R&D and capital expenditures in 2024. They also all generate publicly reported revenues in at least three arenas, which is how we defined "actively competing" in this report.

7 Samsung here refers to the broader Samsung Group, which includes (but is not limited to) affiliates such as Samsung Electronics, Samsung Securities, Samsung C&T, Samsung Life Insurance, Samsung Fire & Marine Insurance, Samsung Heavy Industries, Samsung Electro-Mechanics, Samsung SDS, Samsung Biologics, and Samsung SDI.

8 World Economic Outlook database, International Monetary Fund, accessed March 2, 2026.

9 Our comparisons in this report are limited to five regions: the United States, Greater China, Europe, Japan and South Korea, and in some cases the rest of the world. Greater China includes Mainland China, Taiwan, Hong Kong, and Macau. Japan and South Korea are grouped together because they share similar regional profiles, and that structure helped us limit our comparison to five.

Chapter 1

10 Our analysis is based on a McKinsey data set covering the world's largest companies. As of 2025, it included 3,770 firms. See sidebar "Methodology" and the technical appendix.

11 Revenue dynamism or shuffle rate is calculated by summing all positive market share gains for each industry. See the technical appendix for details.

12 For 2040 scenario details, see *The next big arenas of competition*, McKinsey Global Institute, October 23, 2024.

13 A model of innovation and technology adoption that describes how new technologies typically progress—starting with slow initial development and limited uptake, followed by a period of rapid growth as performance improves and adoption accelerates, and eventually reaching maturity as growth tapers off and the market becomes saturated.

14 Marija Maisch, "Global BESS demand jumps 51% in 2025 as installations top 300 GWh," *pv magazine*, January 20, 2026.

15 Teo Lombardo et al., "Global battery markets are growing strongly—and so are the supply risks," International Energy Agency, February 13, 2026.

16 See Chapter 2 Section 5 for more details and sources, as well as the compendium.

17 Note that the aerospace and defense arena grew roughly 9 percent per year between 2022 and 2025 (for a three-year total of 28 percent, as noted in Exhibit 3), and that this industry classification in our data set excludes the markets for drones and space-related ventures. Drones are included in one of our 18 future arenas—future air mobility—and space is tracked as its own future arena. Two examples of postpandemic recovery—travel and leisure, and air services—grew 48 and 43 percent, respectively, from 2022 to 2025 following sharp declines during the COVID-19 pandemic.

18 For more on eight "almost-emergent arenas," see *The next big arenas of competition*, McKinsey Global Institute, October 23, 2024.

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20 "Mind the gaps: the fraught road to quantum advantage," Jens Eisert and John Preskill, arXiv, October 22, 2025, revised November 4, 2025.

Chapter 2

21 We use private company valuations throughout this report interchangeably with market capitalization, because they both represent the market's best understanding of a company's total value. For more details, see the technical appendix. xAI became part of SpaceX, also private, as of February 2026.

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26 The seven companies shown in Exhibit 8 were selected as those that rank among the top 30 global spenders on combined R&D and capital expenditures in 2025 within the AI foundation theme and account for more than 80 percent of the theme investment increase between 2022 and 2025.

27 "Outlays by function," in *Combined statement of receipts, outlays, and balances of the United States Government*, fiscal year 2025, US Department of the Treasury, Bureau of the Fiscal Service, December 19, 2025; Joseph W. Kane, Adie Tomer, and Ben Swedberg, "Four recent trends in US public infrastructure spending," Brookings, March 27, 2025.

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29 Announced capital investment for the seven selected companies for 2026 is more than $700 billion. 2026 R&D budgets for these companies have not been announced, but the figure was nearly $300 billion in 2025 and has been rising since 2022. Rafe Rosner-Uddin, "Amazon shares fall as it prepares $200bn AI spending blitz," *Financial Times*, February 6, 2026; Deborah Mary Sophia and Kenrick Cai, "Google parent Alphabet forecasts sharp surge in 2026 capital spending," Reuters, February 4, 2026; Jaspreet Singh, "Meta expects annual capital expenditures to rise on superintelligence push," Reuters, January 28, 2026; Anton Shilov, "TSMC 'very nervous' about AI bubble concerns despite another record-setting quarter, but assured of demand," Tom's Hardware, January 15, 2026; "Oracle announces equity and debt financing plan for

calendar year 2026," Oracle, February 1, 2026.

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31 "AWS and OpenAI announce multi-year strategic partnership," OpenAI, November 3, 2025.

32 "NVIDIA announces financial results for fourth quarter and fiscal 2025," Nvidia, February 26, 2025.

33 "4Q25 quarterly management report," TSMC, January 15, 2026.

34 "ASML reports €28.3 billion total net sales and €7.6 billion net income in 2024," ASML, January 29, 2025; "Q4 2025 and full-year financial results," ASML, January 28, 2026.

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38 For example, TikTok Shop integrates shoppable videos and live streams directly into its "For You" feed.

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Technical appendix

This report builds on the analytical framework introduced in *The next big arenas of competition*.[1] The original 2024 report identified 12 "arenas of today" — industries that stood out from 2005 to 2020 in both growth and competitive dynamism. Insights from the analysis were then applied to define 18 "arenas of the future" with modeled revenue scenarios to 2040. The current 2026 report updates McKinsey's original company-level data set through fiscal year 2025 and empirically assesses how the 18 future arenas are evolving relative to the scenarios described in 2024.

Rather than resizing the 2040 scenarios, this update evaluates whether observed developments between 2022 and 2025 align with the previously modeled higher- and lower-growth trajectories. It also expands the analysis to examine capital intensity, profitability, competitive dynamism, and regional exposure in greater depth.

Company-level data set and coverage

Our analysis is based on a longitudinal data set of 3,770 publicly listed and large private companies, representing approximately $55 trillion in revenues in 2025. The data set spans 70 countries and captures the majority of large-company economic activity across the economy, split into 69 industries.

The data set builds on the universe constructed for the 2024 report. In that original analysis, companies were included if they met minimum market-capitalization thresholds of $3.5 billion in 2005 or $5 billion in 2020. These thresholds were designed to focus the analysis on companies with sufficient scale to influence growth, investment intensity, and competitive dynamics at the industry level over time.

For the current 2026 report, the 2024 data set was updated through 2025 and supplemented in two ways. First, we included the largest global companies (approximately 4,000 of them) by market capitalization as of 2025. Second, we added smaller firms with meaningful participation in one or more of the 18 future arenas, particularly in industries where early-stage innovation and scaling dynamics are material (for example, in future air mobility and in AI software and services). This approach preserves longitudinal consistency while ensuring the capture of emerging arena activity.

Industry mapping and revenue allocation

Company revenues are allocated across 69 industries using reported segment disclosures, regulatory filings, earnings transcripts, investor presentations, and capital-markets and industry databases. Where segment reporting is incomplete, revenues are allocated using consistent, publicly available information and industry benchmarks, with the objective of maintaining comparability across firms and over time.

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For example, Microsoft's revenues are split across eight industries: AI software and services, cloud services, digital advertising, video games, cybersecurity, software, hardware, and consumer electronics. Allocations are updated where segment reporting changes materially, and care is taken to avoid double counting across industries.

The 18 future arenas defined in the 2024 report are constructed from this underlying industry structure. Companies may participate in multiple arenas depending on the composition of their revenues.

Because operating cash flow is inherently company-specific and not easily apportioned across activities, we classify "arena companies" as firms for which at least 10 percent of revenue is tied to one or more future arenas. This threshold is intended to capture meaningful strategic participation while preserving comparability across companies of different sizes and business models.

Allocation of market capitalization, investment, and profitability

To enable industry- and arena-level analysis, we allocate financial metrics across industries using a consistent framework.

Market capitalization, which reflects investor expectations of future growth and profitability, is allocated primarily based on revenue shares and adjusted using industry-average valuation multiples to better reflect differences in growth prospects and margin structures. Average industry market-cap-to-revenue multiples are derived from "pure play" companies in our data set (defined as firms that generate all of their revenues within a single industry) to ensure that benchmark multiples reflect industry-specific valuation dynamics. Private company valuations use disclosed post-money financing values where available.

Capital expenditures, research and development spending, and invested capital are similarly allocated across industries using revenue shares as a baseline, with adjustments for industry-specific capital expenditure intensity and R&D intensity.[2] Arena-level investment therefore represents the sum of allocated capital expenditures and R&D across firms.

Profitability is assessed using net operating profit less adjusted taxes (NOPLAT) and return on invested capital (ROIC). ROIC is calculated as NOPLAT divided by invested capital, excluding goodwill and acquired intangible assets, to better reflect returns on operating capital employed. ROIC is computed for companies with full disclosure of NOPLAT and invested capital in the relevant years and with annual revenues exceeding $1 billion. NOPLAT and invested capital are allocated based on revenues and weighted versus industry-average profitability levels. Because accounting standards, financing structures, and policy environments differ across countries, cross-regional comparisons of ROIC are directional and should be interpreted in context.

For selected analyses, we use economic profit, which is calculated as NOPLAT minus a capital charge (invested capital × weighted average cost of capital) and which shows whether a business earns returns above its cost of capital. For value-chain segments that are not pure plays, we estimate segment economic profit as allocated segment NOPLAT less a segment capital charge, using a standardized weighted average cost of capital of 8.5 percent. These calculations rely on simplifying allocation and sizing assumptions and should be read as directional indicators of value creation rather than precise valuations.

[2] Adjustments for R&D expenses reflect product and technology development costs, taking into account one-time or non-recurring items, in order to ensure consistency for benchmarking across companies and time periods.

Measuring growth and competitive dynamism

As in the original report, our core metrics are revenues and market capitalization. Revenues reflect realized economic activity, while market capitalization captures investor expectations regarding future growth and profitability. Because market value is inherently forward-looking and can be influenced by macroeconomic conditions and valuation multiples, we complement these measures with analysis of investment intensity and profitability.

Competitive dynamism is assessed using observed market-share shifts among leading firms. In the current 2026 report, revenue dynamism is measured using a "shuffle rate," defined as the aggregate change in market shares among the players within each industry over time:

$$Company\ share = \frac{Company\ revenue}{Industry\ revenue} \text{ or } Company\ share = \frac{Company\ market\ capitalization}{Industry\ market\ capitalization}$$

$$\Delta\ Company\ share = Company\ share_{2020} - Company\ share_{2005}$$

$$Industry\ shuffle\ rate = \sum positive\ \Delta\ Company\ shares = \sum \frac{|\Delta\ Company\ shares|}{2}$$

From 2022 to 2025, revenue shuffle rates averaged approximately 14 percentage points in future arenas, compared with ten percentage points in non-arenas. Because the 2022–25 period spans only three years, conclusions regarding sustained structural shifts are drawn cautiously.

Tracking performance against 2040 scenarios

The 2024 report modeled higher- and lower-growth revenue scenarios for each of the 18 future arenas through 2040. The 2026 refresh evaluates whether recent performance aligns with those trajectories.

Scenario assessments incorporate multiple inputs, including:

- Revenue compound annual growth rates for 2022–25
- Market capitalization growth
- Competitive dynamism
- Evidence of technological or business-model step changes
- Escalatory investment patterns
- The scale and expansion of addressable markets
- Industry life-cycle stage

Based on these inputs, arenas are categorized as tracking toward the upper-bound, middle-track, or lower-bound pathways relative to the 2040 scenarios.

Regional attribution and overseas revenues

Regional exposure is assigned based on company headquarters' location. This approach aligns with consistently reported disclosures and provides a proxy for where capital formation, technological capabilities, and strategic control are anchored.

Approximately 75 percent of companies in our data set report overseas revenues, and 30 percent generate more than half of their revenues outside their home region. For analytical consistency, we assign each company's revenues to its headquarters region. "Overseas revenue" is calculated from firms' reported geographic segments: Any revenue originating outside the company's headquarters region (defined here as United States, Greater China, Europe, Japan and South Korea, or rest of the world) is classified as overseas. This headquarters-based approach is consistent and reproducible but represents a simplified allocation and should be treated as an approximation rather than a precise measure of cross-border economic activity. It may therefore overstate the domestic economic contribution of globally diversified firms and understate the contributions to host countries; accordingly, our regional findings reflect company-level positioning, not national GDP impacts.

Identification of omniscalers

In Chapter 3, we identify a group of "omniscalers"—companies that compete across multiple future arenas and invest at high intensity. Companies are included if they meet two criteria: ranking among the top 30 global spenders on combined R&D and capital expenditures in 2024, and generating publicly reported revenues in at least three future arenas.

Nine companies meet these criteria as of 2025: Alibaba, Alphabet, Amazon, Apple, Huawei, Meta, Microsoft, Samsung, and Tesla. In some cases, ecosystem clusters (for example, Tesla, SpaceX, and xAI) are considered jointly where capital, leadership, and strategic direction are deemed closely aligned. "Cluster" denotes entities with shared control or common leadership; strategic investments or commercial partnerships without shared control are not classified as clusters.

To classify each omniscaler's level of participation in an arena, we apply the following definitions. A company's *largest business* is defined as an arena from which the company generates the majority of its annual revenues (that is, more than 50 percent). In some cases, a company's largest business may lie outside the defined future arenas—either in past arenas or in non-arena markets—even if the company maintains some lower level of participation in multiple future arenas. A *revenue-earning business* refers to an arena in which the company generates revenues, but which accounts for less than 50 percent of total annual revenues.

We also track non-revenue or indirect exposure, which includes three categories:

— *pre-revenue activities,* where the company has developed or launched relevant products or pilots but is not yet generating revenues;

— *internal production,* where the activity primarily supports the company's core offerings and is not sold as a standalone revenue line; and

— *equity investments,* where the company holds an ownership stake (including minority or venture investments, or acquisitions with retained equity) in another company active in the arena.

We exclude partnerships that involve no equity or upfront capital commitment and no commercial or offtake agreement. This report also tracks early-stage initiatives, partnerships, and announced investments in arenas, though disclosures are uneven. As a result, we do not claim exhaustive identification of all potential omniscalers. Thresholds and classifications may be refined as improved data become available.

Treatment of early-stage and private activity

Certain arenas—notably, AI software and services as well as future air mobility—include substantial private company participation. Where possible, we incorporate disclosed post-money valuations, funding rounds, and publicly reported revenue or investment figures. Coverage remains incomplete in some industries and regions due to limited disclosure. We treat private company valuations as the equivalent of market capitalization in our aggregate roll-ups by industry and theme.

Currency and inflation

All financial figures are reported in nominal US dollars unless otherwise noted. Revenues and market capitalization are not adjusted for inflation. Currency conversions are based on annual average exchange rates for flow metrics (such as revenues, NOPLAT, and investment) and on year-end spot exchange rates for point-in-time metrics (such as market capitalization).

Limitations

The analysis is subject to several limitations. Revenue allocations may involve estimation where segment disclosures are incomplete. Market capitalization can be volatile and influenced by macroeconomic conditions beyond industry fundamentals. The 2022–25 window is relatively short for assessing long-term structural change. Cross-country differences in accounting and policy environments affect comparability of profitability measures. Finally, headquarters-based regional attribution does not capture the full complexity of global production and revenue flows.

Despite these limitations, the consistent application of methodology across industries and over time allows robust comparative analysis of growth, dynamism, and value creation across the 18 future arenas.

McKinsey Global Institute
March 2026
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