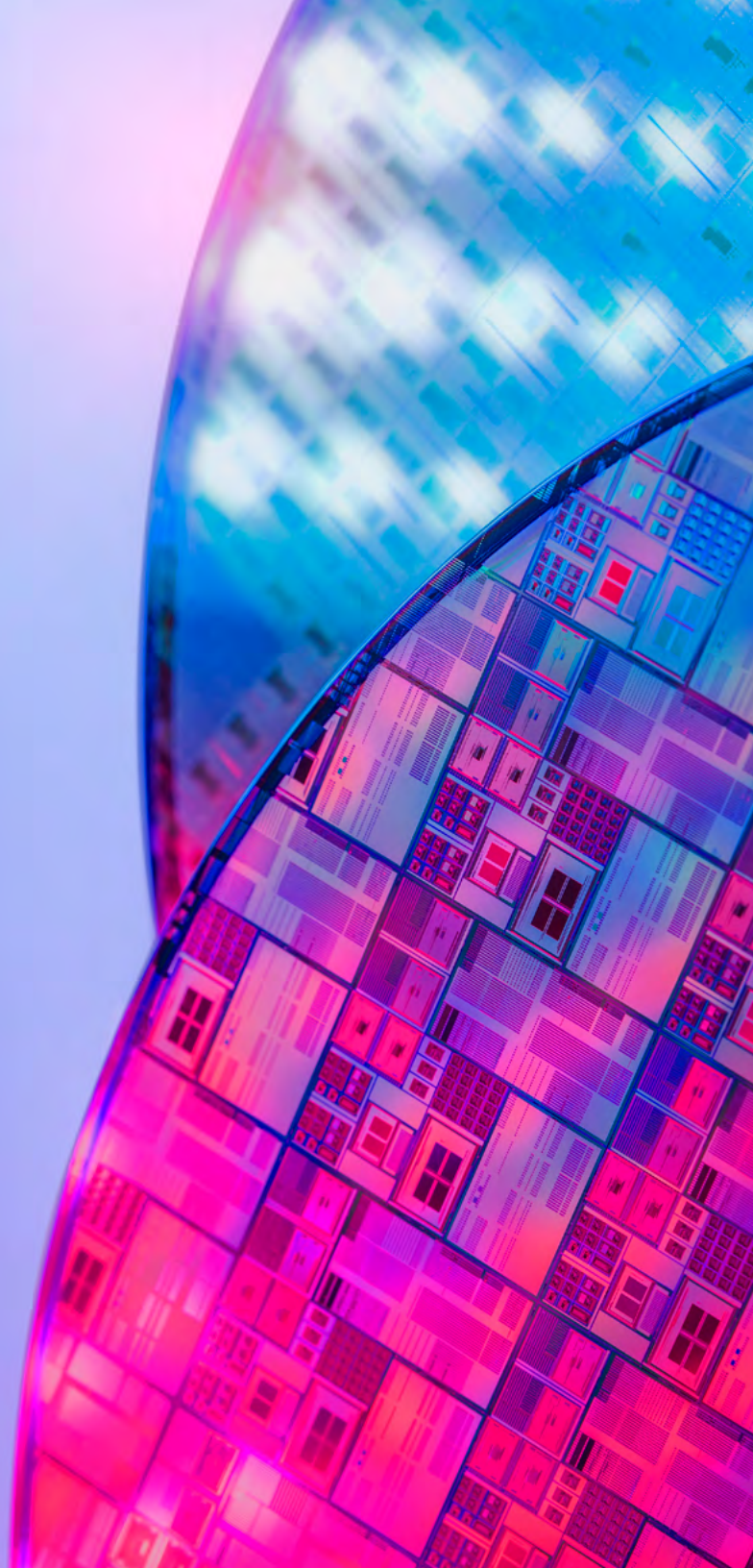
Global semiconductor industry outlook 2022

Financial and operational confidence surges to an all-time high despite supply chain challenges



KPMG LLP
Global Semiconductor Alliance

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This is the 17th annual KPMG Global Semiconductor Industry Outlook, with key findings from a survey of 152 semiconductor professionals from across the globe representing organizations large and small. The survey was conducted in the fourth quarter of 2021 by KPMG and the Global Semiconductor Alliance (GSA).

The publication is designed for semiconductor CEOs, COOs, CFOs, controllers, finance leaders, and strategic and corporate development personnel.

This report is equally relevant for executives of companies whose products are heavily reliant on semiconductor components, including products for telecommunications infrastructure, cloud services, platform providers, devices supporting Internet of Things (IoT) applications, and products destined for automotive electronic applications.

Foreword

Although the challenges of the past couple of years are not yet in the rearview mirror—with the semiconductor industry still dealing with shortages, while committing to long-term capital investments—the future of the industry appears to be as positive as it has ever been on virtually every level.

The demand for products powered by semiconductors is massive and driven by multiple end applications, from smart electric cars and mobile devices to communication infrastructure and IoT devices. The industry delivered all-time high revenue of $556 billion in 2021 and is expected to reach $600 billion in 2022.[1] And with supply chains struggling to meet that demand, many industry insiders believe the chip shortage will stretch into 2023, which would continue to impact end markets worldwide.

Despite the supply chain challenges—which highlighted once again the criticality of semiconductors to our quality of life, work productivity, education, and national security—confidence in the industry's growth potential has never been greater. In fact, the KPMG Semiconductor Industry Confidence Index is at an all-time high.

To address future demand, more than half (53 percent) of the semiconductor executives surveyed in new research from KPMG and the Global Semiconductor Alliance (GSA) say their organization has moved toward an end market orientation, which suggests they are prioritizing the specific requirements of the organizations who use their products every day to grow their own businesses.

With cars now essentially computers on wheels, and a supply chain not optimized for semiconductor components, the global automotive industry has been hit especially hard, as automakers are expected to incur more than 80 percent of the estimated $125 billion in foregone semiconductor revenue in 2021.[2] Other end segments, such as gaming, mobile, and infrastructure, have fared better due to the higher level of sophistication and preparedness of their supply chains.

Some positive signs are materializing, however, that suggest the industry is slowly resolving the supply challenges. In October 2021, for example, delivery times seemed to be leveling off compared to the steep increases over the prior nine months.[3] Nevertheless, distributors are preparing customers to expect extended lead times in 2022, notably for ceramic capacitors and chip resistors.[4] Although the market continues to be tight, several major global auto manufacturers are reporting that improved chip availability has factories operating at near-normal capacity for the first time in months.

As a strategic priority, talent has been near the top of the list for industry decision makers over the last couple of years and remains a key focus. In addition to more traditional challenges—for example, semiconductor talent being attracted by tech giants looking to develop their own chips—new issues have emerged such as remote work, employee burnout, and an increased willingness and ability to enable talent to move into new roles and locations.

These issues and concerns are not going away anytime soon. The demand for semiconductors—and the related need for professionals who speak the language of these products—is expected to remain strong for the next few years.

Lincoln Clark
Partner in Charge
Global Semiconductor practice
KPMG in the U.S.

Key findings

Financial expectations

Confidence is at an all-time high with surging demand in multiple end applications driving business projections upward and accelerating the need for additional capacity.

95% expect their company's revenue to grow over the next year, and 34% forecast it will grow more than 20%.

88% expect capital expenditures (capex) to increase over the next year.

Operational expectations

Semiconductor firms continue to organize around end markets and solutions, to better focus on customer demand. Many are making investments in their supply chain.

53% agree their organization has moved toward being more oriented by end markets (for example, automotive, communications, etc.).

56% foresee the semiconductor shortage continuing into 2023.

60% plan to diversify their supply chain in the next 12 months.

Growth products and applications

Applications for the automotive sector surpassed IoT and are now perceived to be the #2 revenue driver for the next fiscal year.

Top three applications driving company revenue growth over the next year:

1. Wireless communications
2. Automotive
3. Internet of Things

Industry issues and strategic priorities

Besides ongoing supply/demand imbalance, semiconductor firms are challenged to attract, develop, and retain skilled talent.

Top three strategic priorities over the next three years (besides growth):

1. Talent development/ retention
2. Supply chain flexibility
3. Mergers and acquisitions (M&A)

Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).

Financial expectations

Key takeaways

— Buoyed by record demand in all key end-markets, nearly all respondents expect company and industry revenue, as well as operating profitability, to increase over the next year.

— Most industry insiders believe their companies' global workforce will grow in 2022.

— The KPMG Semiconductor Confidence Index increased considerably year-over-year to an all-time high, reflecting the industry's strength.

> **"The acceleration to digital in all areas of our personal and professional lives is driving the semiconductor industry to new heights in growth and innovation. There has never been a more exciting time to be a part of this essential industry."**
>
> — Jodi Shelton
> CEO, Global Semiconductor Alliance

Financial expectations

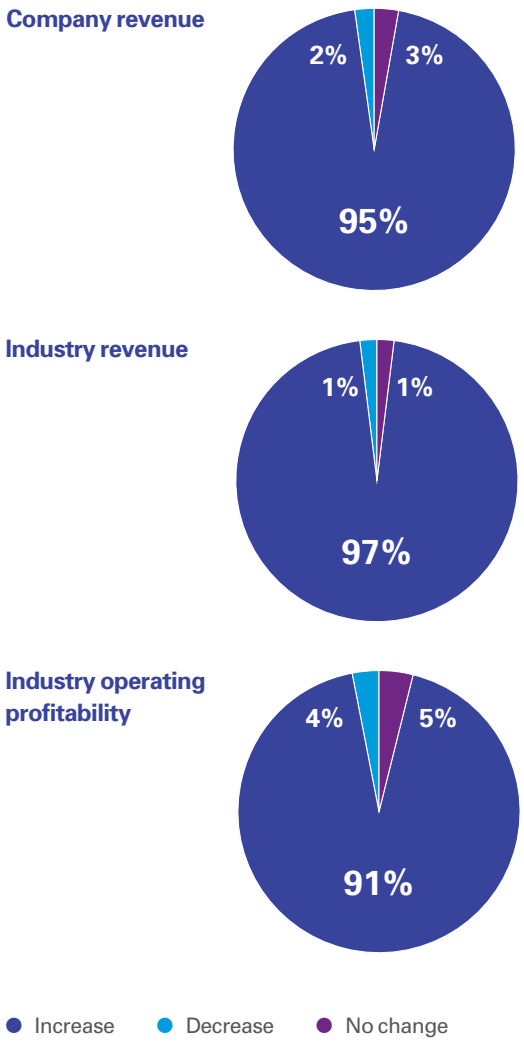
The outlook for revenue and profitability has grown stronger

2021 was another banner year for the semiconductor industry with global sales of $556 billion, a 26 percent increase over 2020. Further, World Semiconductor Trade Statistics projects global semiconductor sales will grow 8.8 percent in 2022, eclipsing $600 billion.[5]

Ninety-five percent of KPMG/GSA survey respondents said they believe revenue at their companies will grow over the coming year, with more than one-third (34 percent) expecting growth of more than 20 percent, suggesting the industry leaders we spoke with are very bullish on their prospects for 2022. From the U.S., across Europe, the Middle East, and Asia, this optimism is fairly consistent regionally.

Respondents' highly optimistic business outlook for the next year is not surprising considering the strong demand for chips within numerous industries, from communications and automotive to healthcare and consumer electronics. With the rollout of 5G infrastructure, the increasing use of artificial intelligence, growth in electric vehicles and connected cars, and the rising demand for chips in IoT applications and consumer products, global semiconductor sales are expected to break $600 billion in the next 12 months.[6]

An overwhelmingly positive financial outlook for 2022



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152). Percentages may not sum to 100% due to rounding.

Company revenue growth optimism skews toward the largest companies (annual revenue of $1 billion or more), 100 percent of which expect their revenue to increase over the next year. That said, more small (annual revenue below $100 million) and mid-sized (annual revenue between $100 and $999 million) firms expect revenue growth to increase by more than 20 percent (47 percent small versus 37 percent mid-sized versus 22 percent large). This is a very clear signal of optimism, since bigger companies are typically more challenged to grow at these rates.

Regarding industry operating profitability, 91 percent believe it's going to grow, with 68 percent saying the increases will be between 1 percent and 10 percent. As positive as these responses are, they do seem to imply an underlying increase in operating costs. This is once again in line with industry investments, record-long material lead times, rising commodity prices, logistics difficulties, and ongoing impacts of the pandemic.

Indeed, from a foundry point of view, the announcement in August 2021 that Taiwan Semiconductor Manufacturing Co. (TSMC) was planning to hike its production fees by 20 percent—the biggest price hike in years by the world's leading chipmaker—corroborates that perception.[7]

In 2020 and early 2021, chip makers were absorbing much of those costs. A number of companies cited COVID-related costs in their earnings announcements as a reason why margins might be different from analyst expectations. But as the industry's supply/demand imbalance levels out, revenue expectations are not driven solely by demand, but also by the ability to set prices, which in many cases is in the hands of the product owners. In 2021, the market grew 23 percent overall following a 20 percent increase in shipments and a 3 percent increase in semiconductor ASP.[8]

Financial expectations

Investment in the business—talent, capex, R&D—expected to be strong

As semiconductor firms continue to look for creative ways to emerge from the recent challenges, it's clear they are willing to spend to do so.

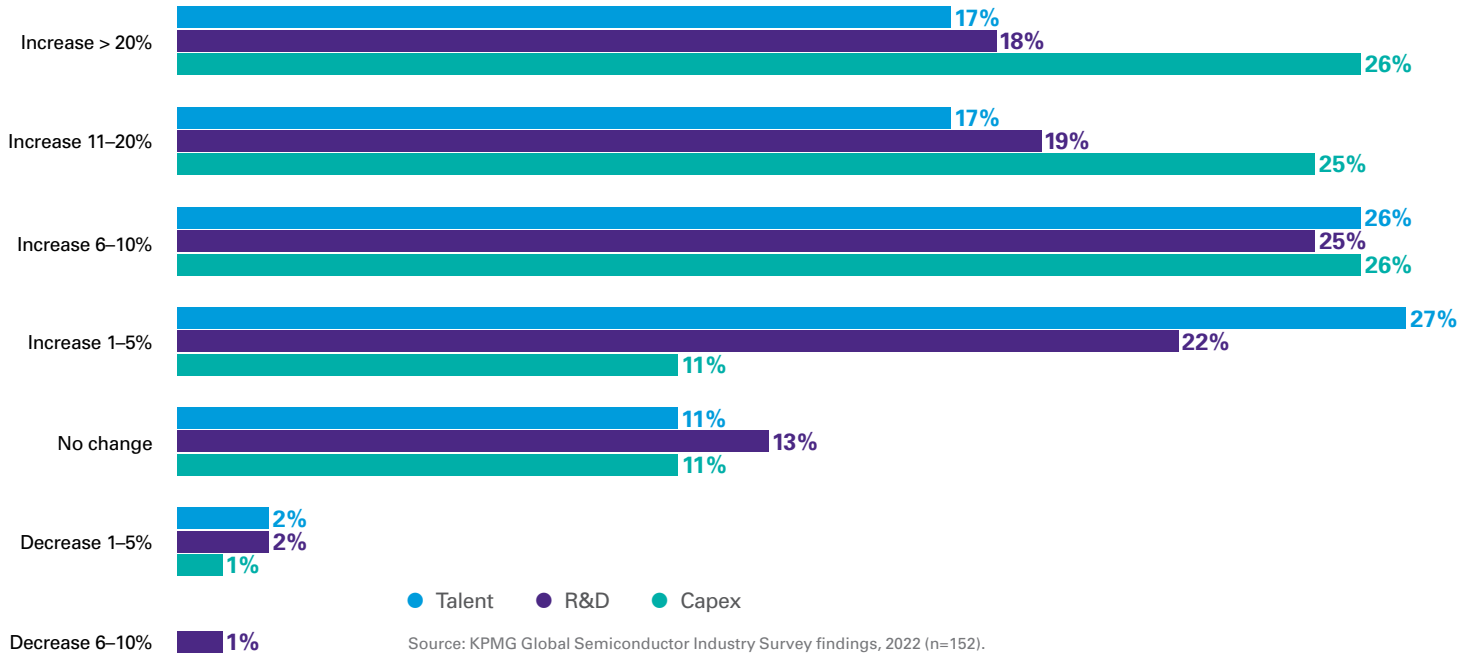
A significant majority of respondents (88 percent and 84 percent, respectively) expect capex, including both equipment and software, and research and development (R&D) spending to increase on an absolute level over the next year, an indication that chip firms are looking not only at improving efficiencies, but also with an eye toward innovation. TSMC, Samsung, and Intel all announced plans to increase capital expenditures in 2022, with TSMC planning to spend $40 billion to $44 billion.[9]

These responses represent a considerable uptick over the 2021 global semiconductor industry outlook responses, in which 73 percent and 71 percent of respondents, respectively, told us they expected to see more capex and R&D spending over the coming 12 months.

Similarly, 88 percent believe their global workforce will grow in 2022—an increase of nearly 40 percent over last year's outlook. As detailed later in this report, talent is the top strategic priority among survey respondents, so this human capital expenditure is an acknowledgment of the need to pay to attract and retain the level of talent that an innovation-based industry requires.

Semiconductor companies are focused on gaining and increasing competitive advantage through strategic investment, and although a number of chip makers are building or plan to build foundries in the U.S. in an effort to reverse the erosion of U.S.-based chip manufacturing,[10] the industry is at a crossroads. As many governments around the world propose and enact funding to support their own domestic semiconductor manufacturing, the U.S. federal government is working to pass the CHIPS Act. A $52 billion investment in the future of chip research, design, and manufacturing, this legislation is intended to maintain U.S. leadership in an industry that is arguably the most critical component of our rapidly digitizing global economy.

Do you expect your company's capex, R&D, and talent investment to increase or decrease over the next year?



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).

Financial expectations

Semiconductor Industry Confidence Index

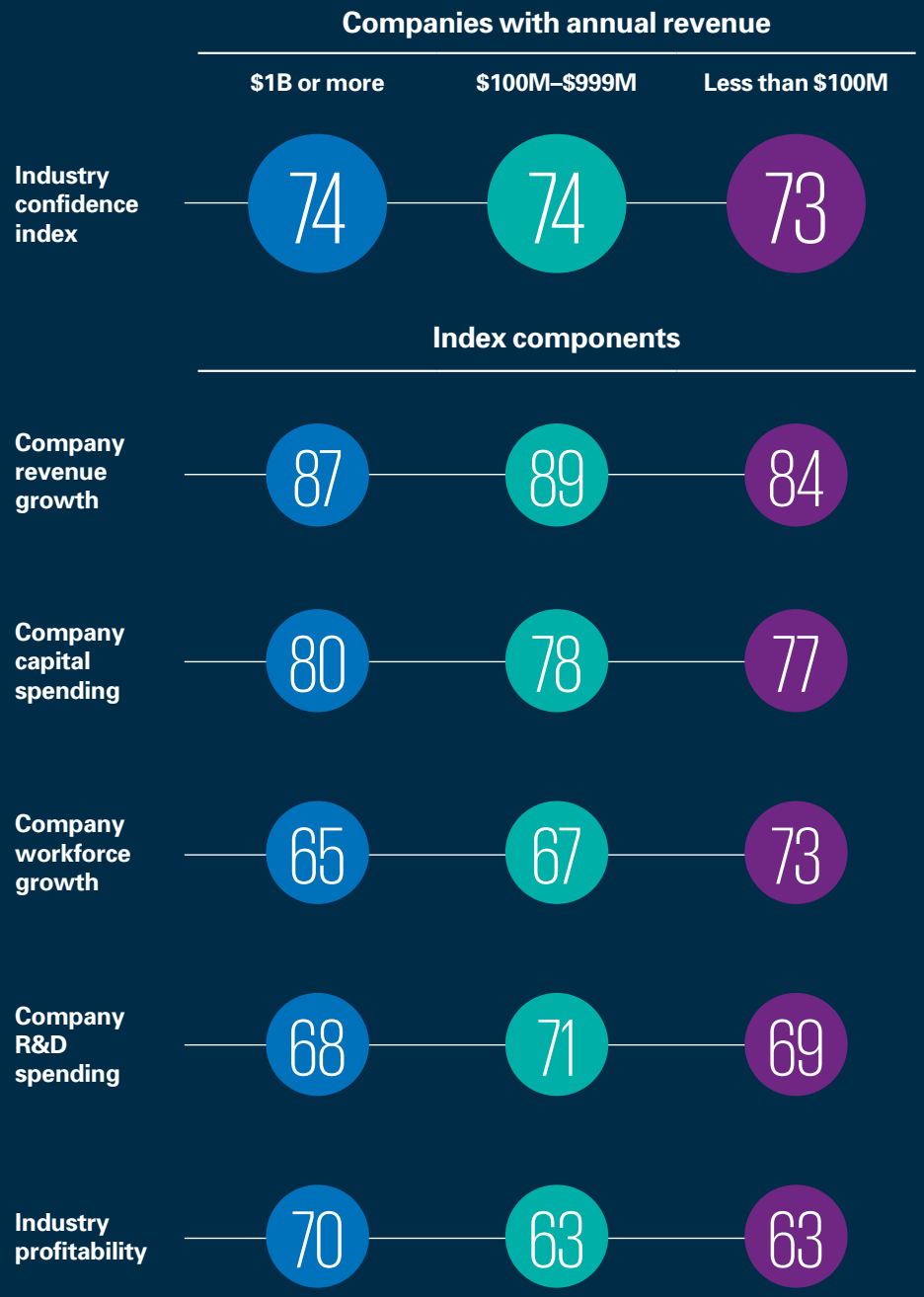
The KPMG Semiconductor Industry Confidence Index is at an all-time high. The index score is based on survey respondents' one-year outlooks for their companies in terms of revenue, workforce growth, capital spending, R&D spending, and operating profitability for the industry.

For 2022, the confidence index surged from 61 to 74, which is not surprising given respondents' highly positive outlook across the various survey questions.

Overall index scores

Typically, smaller companies maintain confidence levels that eclipse their larger cohorts. Indeed, the index was at 68 last year for smaller semiconductor companies—which would have been a record for the full index—while mid-sized and large companies had readings of 63 and 53, respectively, which were still historically competitive figures.

However, in the 2022 survey, large companies in particular exhibited a substantial jump from 53 to 74, largely on the promise of ongoing demand, while smaller companies' index went from 68 to 73. This increase is the result of respondents' confidence in workforce growth, increased capital spending, and revenue growth. It is possible smaller companies' confidence grew less than bigger companies' because smaller companies are finding it more difficult to secure product in such a constrained environment.



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).

Operational expectations

Key takeaways

— Semiconductor firms continue to organize around end markets, rather than products, to have better focus on customer demand during these challenging times.

— COVID-19 has led the majority of semiconductor companies to implement permanent work-from-anywhere and/or flexible hours policies.

— More than half of survey respondents believe the ongoing chip shortage won't end until sometime in 2023.

> **"Semiconductor companies are striving to meet customer orders, but the chip shortage is still expected to last into 2023. To align with customer expectations, most companies say they have moved towards being oriented by end markets."**
>
> — Lincoln Clark
> Partner in Charge, Global Semiconductor practice, KPMG in the U.S.

Operational expectations

Companies are more oriented toward end markets

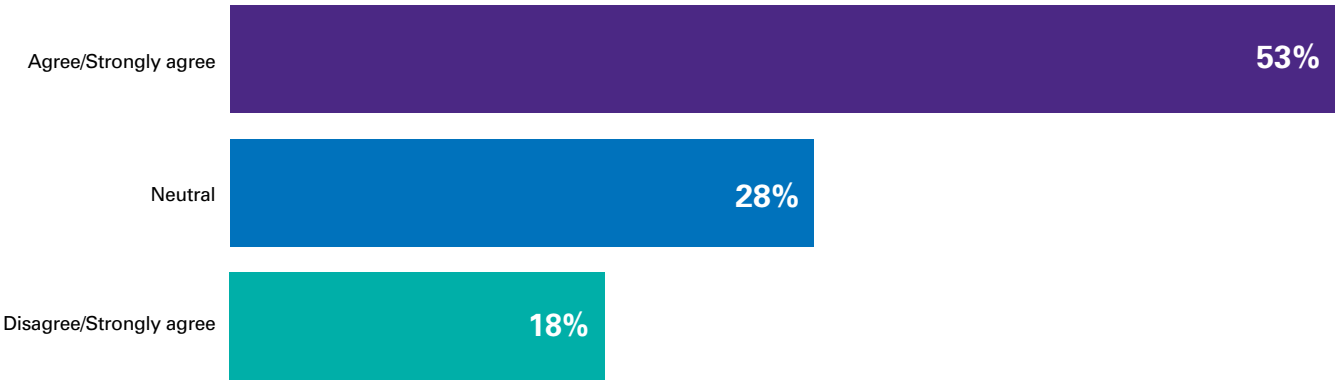
More than half of respondents (53 percent) agree their organization has become more oriented toward end markets, such as automotive, communications, or consumer electronics. Interestingly, 64 percent of large companies said they are realigning their business toward end markets, while only 38 percent of smaller firms cited this orientation.

This data point suggests that companies are focusing on unique application requirements, as opposed to creating products that can be sold to multiple end applications and users. Indeed, the top challenge in terms of developing products and taking them to market, as cited by 30 percent of respondents, is the fact that customers are requiring more complex solutions. On a related note, 42 percent said solutions were a core competency of their company.

In terms of company size and industry segment, respectively, the strongest responses came from the largest companies and the foundries/IDMs (integrated device manufacturers).

This is also significant for specific sector supply chains, particularly the automotive industry, which utilize more chips every new model year, especially in electric vehicles. If semiconductor companies are structured by end markets, perhaps the chances of material disruption among industries for which semiconductors are an integral component will be diminished the next time there's a product availability gap. Today's nontraditional powertrain designs—hybrid and fully electric vehicles—have twice the semiconductor content (by value) of internal combustion engine (ICE) vehicles. Tomorrow's fully autonomous vehicles, equipped with LiDAR sensors, image-recognition systems, and 5G communications, will likely have eight to ten times as much semiconductor content as nonautonomous vehicles.[11]

Semiconductor companies reporting their organizational structure has moved toward an end-market orientation



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).
Percentages do not sum to 100% due to rounding.

Operational expectations

COVID-19 inspired numerous long-term organizational changes, but none more ubiquitous than permanent flexible work arrangements

Respondents cited permanent work-from-anywhere as the leading COVID-19-related change. Perhaps even more striking, however, are the regional differences: 63 percent and 76 percent of U.S. and Europe/Middle East/Africa (EMEA) respondents, respectively, said workforce flexibility is the top change, compared to just 37 percent in Asia/Pacific (ASPAC). One factor in this divergence could be the type of business the respondent is in—16 percent of ASPAC respondents are foundries, which need people physically and regularly on-site.

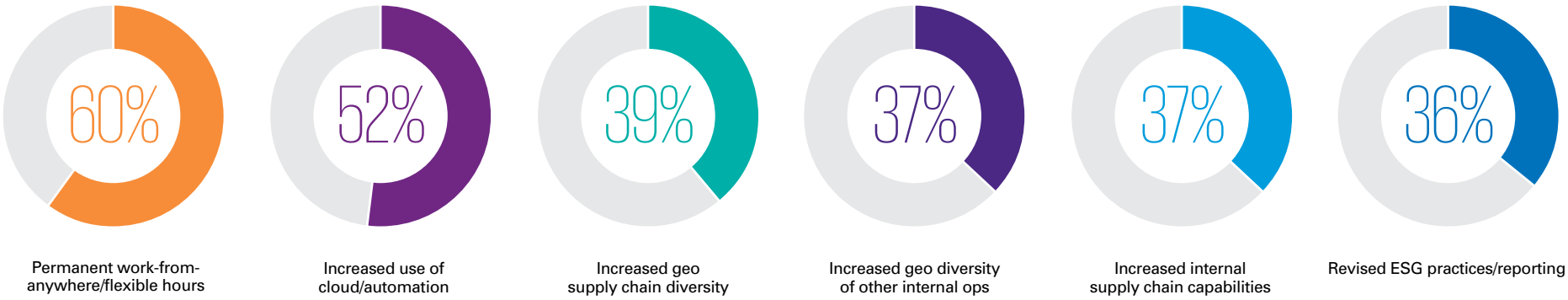
The second most common COVID-19-related change is an increase in the use of cloud and/or automation technologies (52 percent). This makes sense as these applications are needed to facilitate remote work as well as various other business operations.

Although still somewhat lower than expected, the environmental, social, and governance (ESG) number is encouraging. Over the past few years, ESG hasn't ranked particularly high on semiconductor respondents' priority list, despite the growing regulatory and societal focus. In this survey, more than one-third (36 percent) say that COVID-19 has led them to revise their ESG practices and reporting policies. Last year, that figure was 28 percent. Forty-four percent of the largest and 43 percent of mid-sized semiconductor companies are addressing ESG relative to only 19 percent of smaller companies.

From a supply chain perspective, 37 percent said they are increasing their internal supply chain capabilities, with 39 percent saying they are increasing the geographical diversity of their supply chain.

These numbers may seem low, but the industry has had to manage complex global and interconnected supply chains for many years. More substantial changes are expected in the end customer supply chains used to source semiconductors. For example, several automakers have started to build relationships directly with chip suppliers rather than continue procurement through Tier 1 suppliers.[13]

Long-term changes implemented as a direct result of COVID-19



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152). Multiple responses allowed. Partial list shown.

Operational expectations

Most industry insiders expect the semiconductor supply shortage to extend into 2023

More than half of survey respondents (56 percent) believe the chip shortage won't end until 2023, while 42 percent think it will end in 2022.

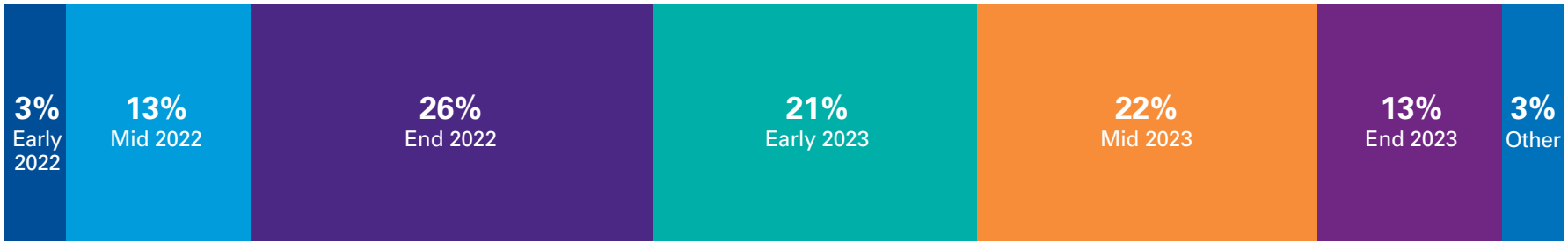
U.S. respondents are a bit more skeptical, with 65 percent saying the shortage will push into 2023. Only 50 percent and 44 percent of ASPAC and EMEA respondents, respectively, believe the shortage will go into 2023. This could be attributable to the fact that, despite last year's announcements, the U.S.-installed semiconductor production capacity has decreased from 37 percent in 1990 to 12 percent in 2021.[13]

Some of the divergent opinions on the length of the chip shortage could be due to the needs and urgency of different end markets. For example, PC demand might be slowing because the initial work-from-anywhere demand has been fulfilled, but other segments, such as infrastructure and automotive, are still dealing with challenges.

However, that imbalance remains critically disrupted in other end markets, especially healthcare, where the persistent COVID-19 pandemic has amplified the chip shortage for various medical devices, such as telehealth monitoring and clinical diagnostic equipment, and medical imaging systems.

Similarly, the auto sector continues to work through its well-publicized supply-chain logjams. Some projections don't see the wholesale car market returning to pre-COVID-19, pre-chip-shortage levels until at least 2025.[14]

Expectations for the end of the semiconductor shortage



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).
Percentages do not sum to 100% due to rounding.

Growth products and applications

Key takeaways

— Respondents again view sensors/MEMS as the segment representing the greatest product growth opportunity.

— Wireless communications, including 5G infrastructure, smartphones, and other mobile devices, are considered the most important revenue driver.

— Although auto manufacturers have been hit especially hard by the chip shortage, semiconductor applications for the sector are rated as the number two revenue driver.

> **"Many indispensable technologies will continue to fuel growth in the next year, including wireless and 5G, Internet of Things, artificial intelligence, and data centers. Yet automotive is also gaining momentum as a revenue driver, as evidenced by the increase in direct relationships between semiconductor companies and auto manufacturers."**
>
> — Scott Jones
> Principal, Global Semiconductor practice, KPMG in the U.S.

Growth products and applications

Sensors/MEMS again viewed as the top growth product

The key semiconductor product areas are nearly identical to last year's survey, with the exception of the number two spot, where microprocessors have overtaken analog/RF/mixed signal. The number one growth area according to survey respondents is again sensors/MEMS, with an increase in IoT applications, smartphones and wearable technology, and demand in the automotive industry driving interest.

Microprocessors are the brain of the end product. With ever higher performance needs always top of mind for consumers, this segment figures to remain an industry focus, both in terms of sales and innovation, particularly for auto infotainment and driver-assist systems.

The analog/RF/mixed signal area of the market was close to the top growth spot, driven by telecommunications and IoT applications.

A new application leader emerges

Over the last few years, IoT was considered by respondents to be the number one revenue driver, often tied with wireless communications. Looking toward 2022, wireless communications increased to number one, automotive was number two, and IoT fell back to number three.

This movement reflects some of the hot topics and current trends seen across the semiconductor sector, such as the ascension of 5G and the increased prevalence of semiconductors in automotive safety, infotainment, industrial automation, and autonomous capabilities.

Semiconductor products with the greatest perceived growth potential over the next 12 months

(averages on a 1–5 scale with 1=low growth and 5=high growth)

	2022 Outlook	2021 Outlook
Sensors/MEMS	3.9	3.8
Microprocessors (GPU/MCU/MPU)	3.8	3.6
Analog/RF/Mixed signal	3.7	3.7
Optoelectronics	3.4	3.3
Memory (Flash/DRAM)	3.2	3.3
Other logic	3.1	3.0
Discretes	3.1	2.9

Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).

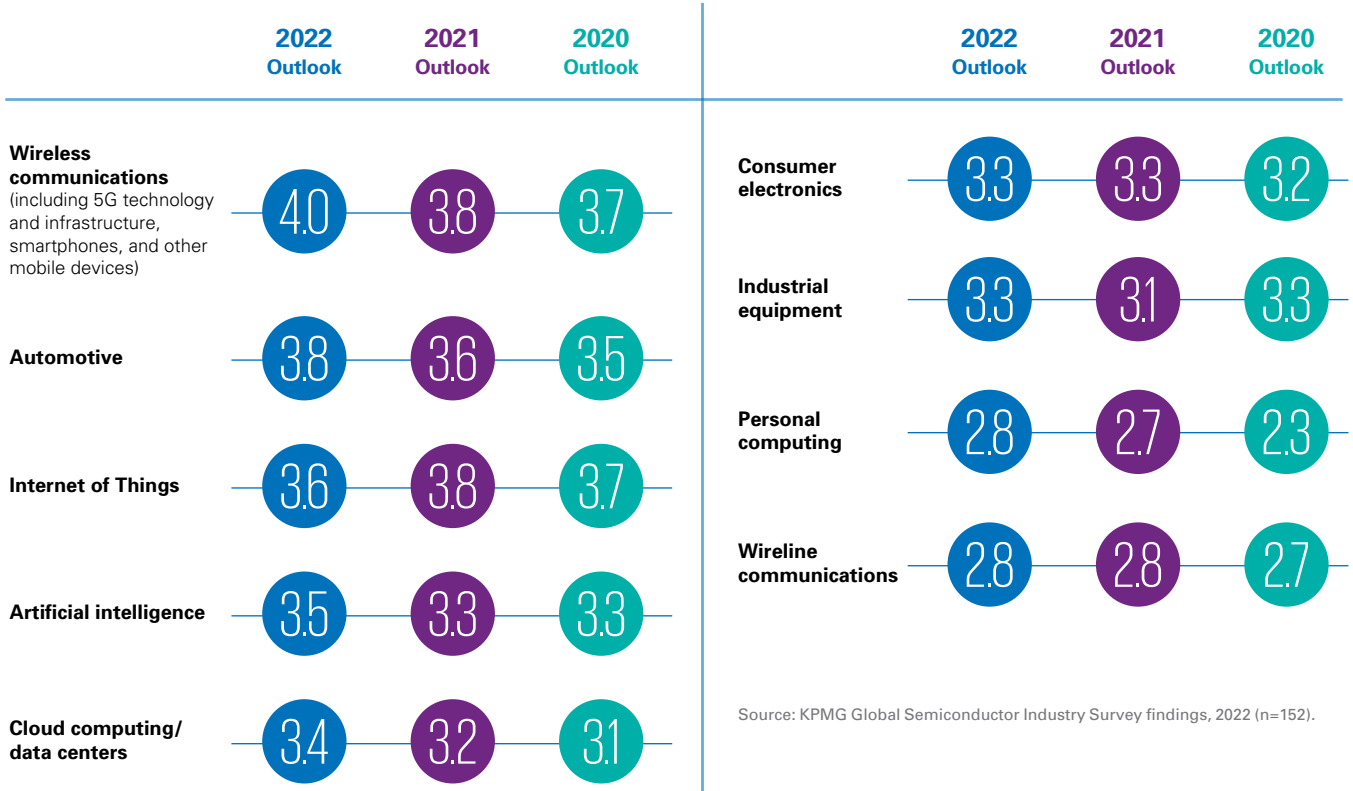
Growth products and applications

With more than half of respondents saying they are reorganizing around end markets, the responses around revenue drivers are not unexpected. More products and solutions are being put together around electric vehicles, data centers, and IoT. Interestingly, many semiconductor sales and go-to-market teams are focusing on bringing more complete solutions to the automotive sector—even though it accounts for only 10 percent to 11 percent of overall industry revenue at this point.

Automotive semiconductors usually require longer design in cycles and more taxing design and testing processes. In the past, when growth rates were lower, this didn't bode well for new investment and focus. The current shortage and the last two years have changed this dynamic. KPMG estimates that the automotive semiconductor market will quadruple, reaching more than $200 billion over the next two decades.[15]

Applications driving semiconductor company revenue over the next year

(averages on a 1–5 scale with 1=low growth and 5=high growth)



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).

Industry issues and strategic priorities

Key takeaways

— The vast majority of respondents cite talent supply, development, and retention as their top strategic priority for the next three years.

— Production capacity constraints and a lack of skilled talent are tied for the top industry issues over the next three years.

— Respondents are bullish on M&A activity.

> **"The shortage of tech talent is real and will not resolve itself. Semiconductor companies need to start creating a multifaceted talent pipeline, including apprenticeships and partnerships with secondary education that foster STEM interest in underrepresented populations."**

— Mark Gibson
National Sector Leader, Technology, Media & Telecommunications
KPMG in the U.S.

Industry issues and strategic priorities

Attracting and retaining talent is a major concern

Talent risk is squarely on the minds of semiconductor company leadership, tying for the number one issue facing the industry over the next several years and rating, by far, as the top strategic priority.

The industry has been dealing with a talent shortage for several years as nonsemiconductor companies started developing their own chips and silicon capabilities.

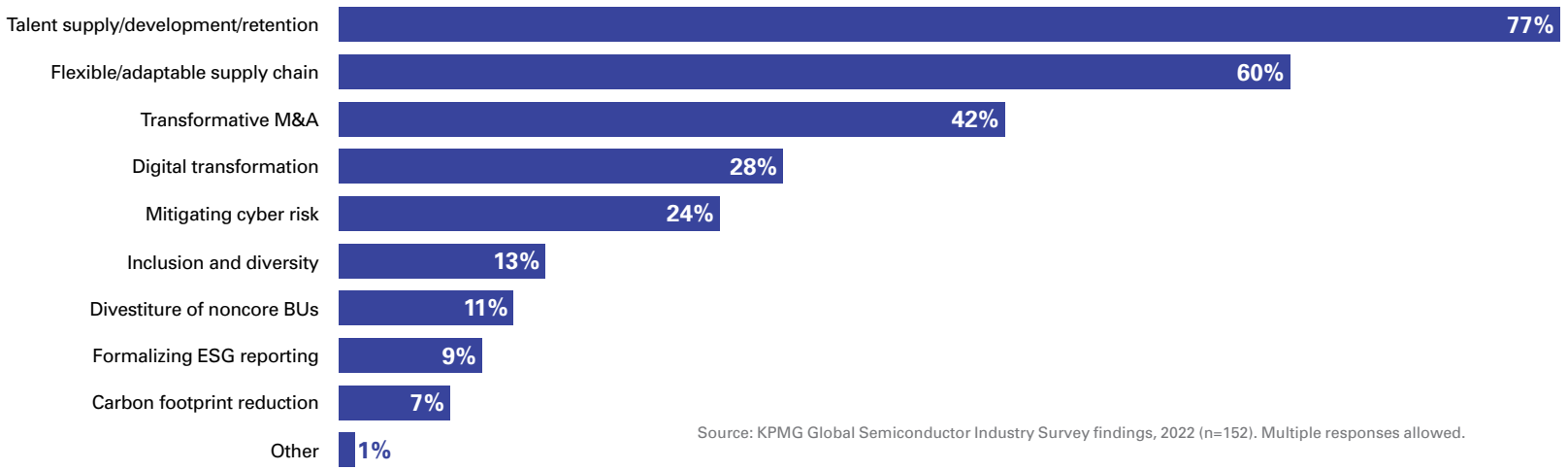
This begs a question: With 88 percent of semiconductor companies expecting their global workforce to grow in the next year—and 34 percent expecting that increase to be more than 10 percent—where will all these workers come from?

Nearly 80 percent of respondents reported that talent supply, development, and retention is their top strategic priority. This is not solely an issue impacting the semiconductor space; companies across the entire technology sector were competing for talent even before the "Great Resignation" phenomenon started.

In this environment, companies would do well to think seriously about upskilling and reskilling existing workers, initiating apprenticeship programs, and partnering with colleges and universities to increase the number of graduates with relevant technology degrees.

When asked about the impact on the industry over the next three years of the various tech giants and platform companies—which are continuing to build out their own silicon capabilities—talent again comes up. At 44 percent, greater competition for talent was far and away the number one perceived impact, with increased foundry capacity constraints a distant second at 24 percent. Somewhat surprisingly, only 19 percent expect these nontraditional chip developers to emerge as serious competitive threats. Semiconductor leaders seem to see the threat in terms of competing for talent, but that is not yet a concern in regard to market share. What's more, the perception of the potential disruption to supply chains from these behemoth companies seems conspicuously low, with only 13 percent citing it as a concern.

Top strategic priorities over the next three years



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152). Multiple responses allowed.

Industry issues and strategic priorities

Geopolitical developments on semiconductor leaders' radar

Another key industry issue is the ever-evolving, and always challenging, geopolitical environment. From that perspective, the top concerns among respondents are the prominence of Taiwan in the global semiconductor supply chain, the nationalization of chip technology and intellectual property, and tariffs and renegotiated trade deals.

These concerns are not surprising when we are seeing increased involvement from governments in the U.S., Europe, and China as they attempt to increase domestic semiconductor production.

Respondents bullish on M&A over the next three years

Transformative M&A activity was a solid number three on the strategic priority list, particularly among smaller companies, 62 percent of which see deals in their future. This appetite for M&A is reflected in the KPMG Global M&A Outlook. Executives in the survey expect deal making to continue because they need to remain on the offense relative to competitors, they have access to record cash levels, and they are feeling pressure from shareholders to increase valuations. Only 7 percent expect deal volume to decline.

We also asked semiconductor executives to consider the type of M&A activity they see themselves undertaking over the next three years. While only 21 percent report no M&A or divestiture plans at all, the majority, 53 percent, said they expect smaller "tuck-in" deals.

This is interesting in light of the response to the previous strategic priorities question, to which 42 percent of respondents said they expected to engage in "transformative" M&A.

Regardless of the type of activity, companies of all sizes and across all regions—the U.S. and EMEA more so than ASPAC, which is historically less M&A-focused—appear to be preparing for substantial activity over the next several years.

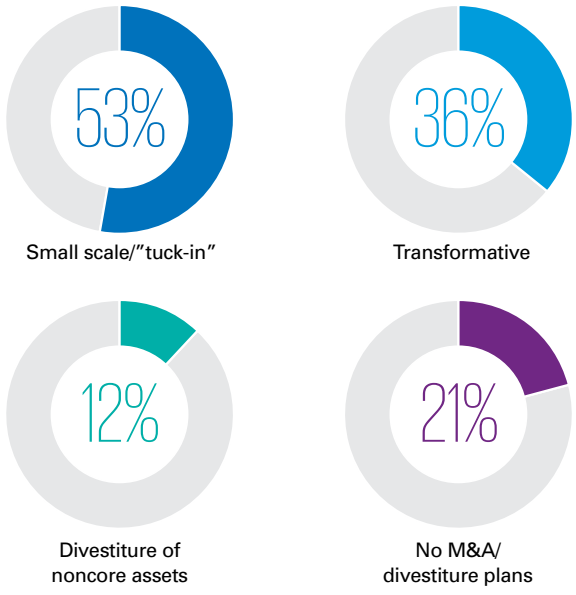
Level of concern about the impact of geopolitical matters on the global semiconductor industry and ecosystem

(averages on a 1–5 scale with 1=not at all concerned and 5=very concerned)

The prominence of Taiwan in the supply chain	4.1
Nationalization of semiconductor technology and intellectual property	3.9
Tariffs and renegotiated trade deals	3.6
Global tax reform	3.2
Climate change legislation	3.1

Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).

Type of M&A and/or divestiture activity companies expect to undertake over the next three years



Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152). Multiple responses allowed.

Next steps

The challenges of the past two years have highlighted the undeniable importance of semiconductors in virtually every aspect of life, business productivity, and national security. The economic resiliency seen across many industries would not be possible without remote connectivity, powerful portable computing solutions, and a robust communication infrastructure powered by semiconductors. The challenges of the pandemic have also exposed points of weakness in the global supply chain. Focusing on strengthening these weaknesses should be a priority for semiconductor companies.

The following are suggested actions for semiconductor companies to consider in connection with several of the topics covered in this report:

Supply chain resiliency

— Partner with critical end customers to ensure they provide long-term and short-term demand forecasts and understand why semiconductor companies should be treated as strategic partners.

— Create centralized teams dedicated to overseeing the procurement of specific components; avoid a just-in-time approach and expand use of micro supply chains.

— Explore organizational changes to streamline and optimize how the supply chain is managed globally.

— Leverage cognitive planning tools that utilize artificial intelligence in an effort to configure and integrate solutions aimed at increasing efficiency.

Capital allocation

— Ensure your portfolio allocation strategy reflects any realignment that might have occurred in the organization's strategic focus (end market vs. products). This is difficult, but it will contribute to potentially higher ROI in the long term.

— Rigorously prioritize and continuously scrutinize project progress and be prepared to make tough decisions in the event of unavoidable delays.

— If the capital allocation is done for specific customers, seek closer partnership and committed volumes.

M&A strategy

— Evaluate potential M&A targets through the lens of make-versus-buy decisions and assess risk and returns appropriately.

— Define M&A guiding principles and clarify if the priority is acquiring technology/IP, talent, or capacity.

Talent/workforce strategy

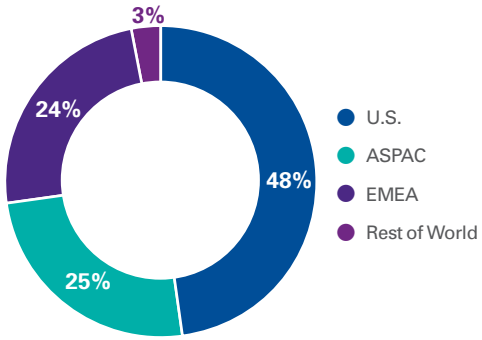
— Perform a skills inventory to determine what knowledge and competencies you have, where your gaps are, and what competitive or operational risks lagging specialized skills presents.

— Complete a hiring and onboarding journey map in the context of the new hybrid work environment to identify high-value touchpoints to support employees and maintain the organization's cultural values.

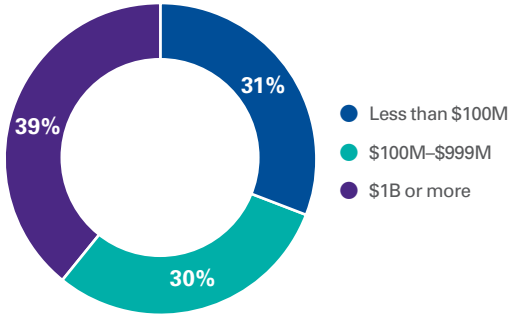
Research methodology

The insights in this report are drawn from a web-based survey of 152 senior executives from global semiconductor companies, conducted in the fourth quarter of 2021 by KPMG and the GSA. In this report, percentages may not sum to 100 percent due to rounding, unless otherwise noted. Respondent demographics are as follows:

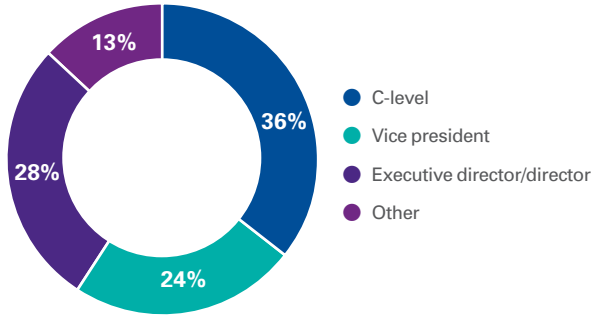
Location



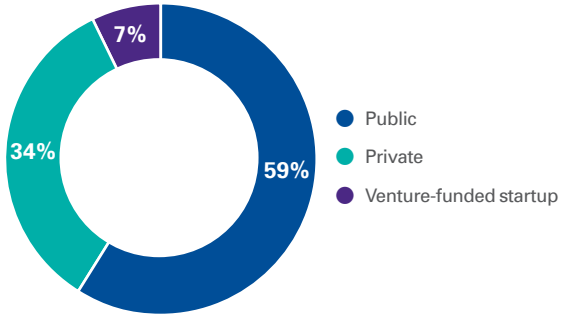
Annual company revenue



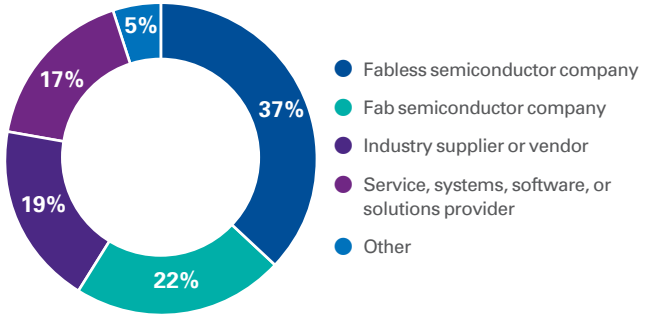
Respondent title



Company type



Industry segment



Source: KPMG Global Semiconductor Industry Survey findings, 2022; n=152.

About KPMG and the GSA

KPMG Global Semiconductor practice

Technology touches virtually every aspect of our daily lives, especially now that much of the business world has entered the work-from-anywhere paradigm. The semiconductor industry is leading the way in this digitized and connected world, and the KPMG Global Semiconductor practice is here to help semiconductor companies navigate it. KPMG firms across the globe work with semiconductor clients of all sizes to look beyond today's pressing business challenges and anticipate the strategic choices that can best position them for both short- and long-term success. For more information, please visit kpmg.com/semiconductors.

Global Semiconductor Alliance

GSA is Where Leaders Meet to establish an efficient, profitable, and sustainable high-tech global ecosystem encompassing semiconductors, software, solutions, systems, and services. A leading industry organization that represents more than 30 countries and 300 corporate members, including 100 public companies, GSA provides a unique, neutral platform for collaboration, where global executives interface and innovate with peers, partners, and customers to accelerate industry growth and maximize return on invested and intellectual capital. Members of the GSA represent 70 percent of the $550B+ semiconductor industry and continue to grow. Learn more at www.gsaglobal.org.

Notes

1 Semiconductor Industry Association press release, *Global Semiconductor Sales Increase 24% Year-to-Year in October; Annual Sales Projected to Increase 26% in 2021, Exceed $600 Billion in 2022*, December 3, 2021.

2 KPMG, *Surviving the silicon storm*, 2021.

3 Bloomberg, *Chip Lead Times Begin to Slow, Suggesting Shortages Have Peaked*, October 26, 2021.

4 Avnet Abacus lead-time guide, January 2022.

5 Semiconductor Industry Association press release, *Global Semiconductor Sales Increase 24% Year-to-Year in October; Annual Sales Projected to Increase 26% in 2021, Exceed $600 Billion in 2022*, December 3, 2021.

6 Semiconductor Industry Association press release, *Global Semiconductor Sales Increase 24% Year-to-Year in October; Annual Sales Projected to Increase 26% in 2021, Exceed $600 Billion in 2022*, December 3, 2021.

7 Financial Times, *Chip prices set to rise into next year as TSMC increases rates*, September 14, 2021.

8 IC Insights, *Annual Revenue Growth to Skyrocket Among Top 25*, November 17, 2021.

9 Wall Street Journal, *TSMC to Invest Up to $44 Billion in 2022 to Beef Up Chip Production*, January 13, 2022.

10 CNET.com, *Intel's chip recovery plan could restore US manufacturing prowess*, November 18, 2021.

11 KPMG, *Automotive semiconductors: The new ICE age*, 2019.

12 KPMG, *Surviving the silicon storm, 2021*.

13 Whitehouse.gov, *Building resilient supply chains…100-day supply chain review report*, June 2021.

14 Motortrend.com, *What Happened With the Semiconductor Chip Shortage—and How and When the Auto Industry Will Emerge*, December 27, 2021.

15 KPMG, *Automotive semiconductors: The new ICE age*, 2019.

About the authors

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Scott Jones leads the Technology, Media & Telecommunications practice for KPMG Strategy and has more than 20 years of experience working with semiconductor and other high-tech companies. He began his career with Intel's Enterprise Products Group and later covered the semiconductor sector at JPMorgan for the top-ranked equity research team on Wall Street. Later he joined AlixPartners to lead their Digital Transformation practice for the Technology, Media & Telecommunications sector. Scott has authored a number of publications on R&D effectiveness, autonomous driving systems, advanced manufacturing processes, and zero-based budgeting, including the KPMG publications *The New ICE Age* and *Surviving the Silicon Storm*.

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