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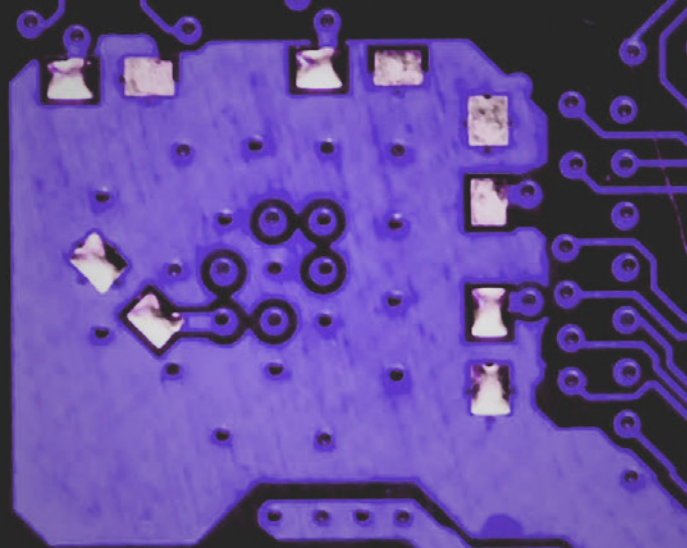
Innovation and talent management are imperatives for semiconductor companies

New skills are needed to generate growth



Global Semiconductor Industry Outlook 2020

Part 3 of 3: Spotlight on strategic priorities and industry issues

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Foreword

This report is the third in a series of three that comprises KPMG's 15th annual Global Semiconductor Industry Outlook. It focuses on the biggest strategic priorities and issues facing the industry over the next three years.

Research timing and COVID-19

The survey data in this report was collected in the fourth quarter of 2019. As such, it reflects semiconductor executive sentiment regarding strategic priorities and industry issues prior to the COVID-19 situation. While both of these topics cover a three year outlook, it is reasonable to assume that some of the responses would be different if the survey was conducted in the first quarter of 2020 when this report was being created.

For example, "Making the supply chain more flexible and adaptable to geopolitical changes" was rated as the eighth strategic priority, and "supply chain disruption" tied for the sixth biggest industry issue. These would surely have rated much higher if the survey was conducted in the first quarter. COVID-19 has indeed disrupted the semiconductor industry's global manufacturing and supply chain apparatus since China is a key link in the chain. While many Chinese facilities are now moving back to normal production, some semiconductor companies have pulled back their earnings estimates or are not providing future guidance until the full global impact of COVID-19 is better understood. Building a supply chain that is more resilient against future disruptions will surely be high on semiconductor company agendas going forward.

This is just one of the key issues and challenges in the semiconductor industry. R&D innovation and talent management ranked as the first and second strategic priorities respectively. As new technologies are created and converge to reveal new business models, there will be a continued need for innovation. The lack of scientists and engineers to fill all expected job openings started well before COVID-19 and the talent gap will likely continue for the foreseeable future.

About the research

The research in the report is drawn from a web-based survey of 195 senior executives from global semiconductor companies, conducted in the fourth quarter of 2019 by KPMG and the Global Semiconductor Alliance. Respondent demographics were as follows (percentages may not equal 100 percent due to rounding):

Company location: U.S.: 45%, ASPAC: 33%, EMEA: 16%, Rest of world: 7%

Company revenue: $1B or more: 32%, Less than $1B: 68%

Respondent title: C-level: 47%, VP: 19%, Director or other: 33%

Company type: Private: 46%, Public: 43%, Venture-funded startup: 11%

Industry segment:

— Fabless semiconductor company: 37%

— Fab semiconductor company: 17%

— Industry supplier or vendor: 17%

— Service, systems, or solutions provider: 15%

— Other: 15%

Key findings:

Innovation & R&D expanded is the top strategic priority

Talent management is both a top strategic priority and industry issue

Territorialism & tariffs is the #1 industry issue

Key takeaways

— Innovation and expanded R&D is increasingly becoming the top strategic priority in the semiconductor industry.

— As different technologies converge in various ways, the diversification of chip applications is putting pressure on chipmakers to bring specialized products to market faster.

Innovation is more essential than ever

Over the next three years, innovation and expanded R&D is the clear top strategic priority of semiconductor companies. It is named by more than half of respondents as a top three priority, representing a 10-percentage-point increase since last year's survey.

As semiconductor applications and end markets diversify, they are creating more opportunities for semiconductor technology inflections. The ability to innovate will be a key competitive advantage. Strategic design wins will be what enables chipmakers to make distinct, customized products for specific customer needs.

As innovation and R&D take precedence, there are signs that companies are becoming better at it. When asked to rank the biggest issues facing the semiconductor industry during the next three years, "increasing R&D costs" dropped 19 percentage points from last year's survey and fell from the number one to the number three issue.

Spending on semiconductor R&D reached record levels in 2019 and respondents expect it to further increase in the year ahead. However, the majority (58 percent) of respondents say they have successfully aligned their R&D spending with their market opportunities, leveraging new approaches like agile portfolio management to derive greater value from their R&D spending. To learn more about R&D efficiency, see Part 1 of the Global Semiconductor Industry Outlook 2020.

Turning ideas to reality requires specialized talent. In this year's survey, talent development and management is tied for the industry's second highest strategic priority. A war for talent is underway as companies compete for a small pool of scientists and engineers with the skill sets to develop innovative products that underpin emerging technologies, including Internet of Things (IoT), artificial intelligence (AI), and autonomous vehicles.

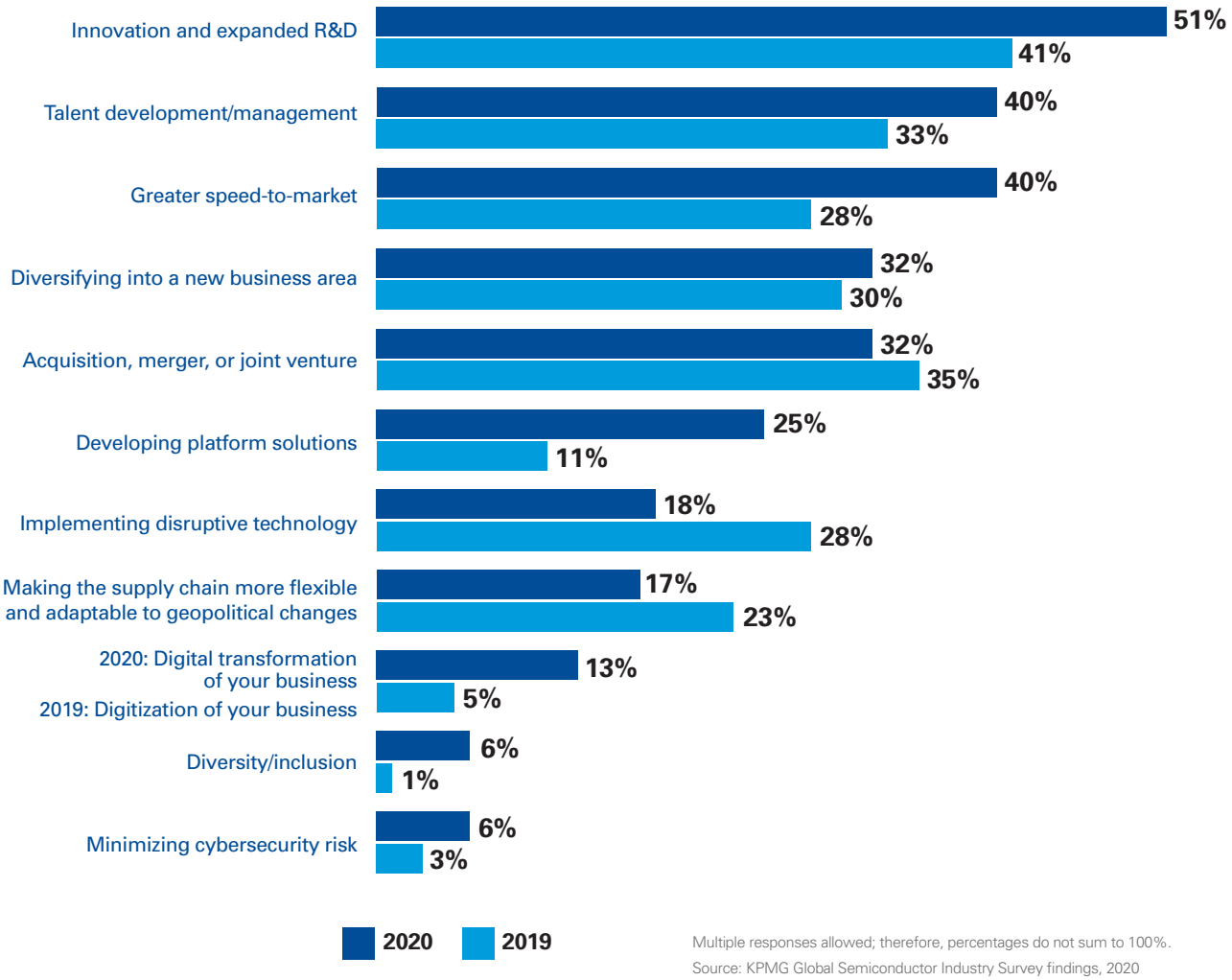
Achieving greater speed-to-market is also a main concern. It is tied for second among strategic priorities and jumped 12 percentage points in the ranking over last year. The significant growth drivers of IoT, 5G, and autonomous vehicles are here now. They are already driving increasing shares of semiconductor industry revenue and this will continue for many years. For example, automotive semiconductors represent a $200 billion end market by 2040.[1] Developers of these emerging technologies are demanding new and advanced chips that are specifically designed for a wave of new applications, ranging from smart home devices to autonomous vehicle systems. Getting products to market faster than competitors is essential. IHS Markit predicts global semiconductor revenue to pick up in 2020, rising more than $25 billion, mainly propelled by 5G smartphones sales.[2]

These customers will be a big part of the future semiconductor industry. Chipmakers must serve their needs ahead of competitors or risk missing the boat. As such, the pressure to get R&D prototypes and design wins is expanding by the day.

1 Automotive semiconductors: The new ICE age (KPMG LLP, 2019)

2 5G's rise set to break the semiconductor market's fall in 2020 (IHS Markit, October 8, 2019)

Strategic priorities of semiconductor companies over the next three years



Multiple responses allowed; therefore, percentages do not sum to 100%.
Source: KPMG Global Semiconductor Industry Survey findings, 2020

"As the semiconductor industry undergoes shifts in markets, customers, and supply chains, leading-edge innovation and securing the right talent will be required to meet customer needs and remain competitive."

—Lincoln Clark, Partner in Charge, Global Semiconductor practice, KPMG LLP (U.S.)

Key takeaways

— Semiconductor companies are staking their growth on their ability to expand into new products and services beyond their traditional businesses.

— M&A will be a key mechanism for companies to diversify their offerings and remain relevant as the technologies that rely on semiconductors rapidly evolve.

M&A accelerates diversification

As the semiconductor industry recovers from 2019's revenue slowdown, chipmakers are preparing again for growth. They are refocusing on increasing scale and proficiency in core competencies as well as expanding into new capabilities to increase revenue.

Mergers, acquisitions, and joint ventures will be a key part of their strategies. As a group, they rank as a top three priority for nearly one-third of semiconductor companies. In addition, 70 percent of semiconductor executives expect their organizations to make some kind of significant transaction in the next three years, while only 30 percent plan no transactions or a divestiture of assets. IDC expects market consolidation ahead, with deals focusing on growth technologies like IoT, automotive, and AI.[3]

Chipmakers plan to undertake M&A activity to achieve four primary goals: to gain new capabilities, to improve current core competencies, to enter new markets, and to enter adjacent markets. The preferred approach to transactions is influenced by company size.

Small and midsized companies with annual revenues of less than $1 billion are more focused on accessing new markets than their larger brethren. Midsized companies in particular are interested in transactions that provide them with new capabilities.

Relative to the smaller companies, large companies with annual revenues of $1 billion or more are more likely to pursue deals that help them expand into adjacent markets. We can look back to Intel's $15 billion acquisition of driverless car software company Mobileye[4] and Broadcom's $18 billion acquisition of enterprise solutions company CA Technologies[5] to see evidence of this. Given their typically high level of maturity and broad portfolios, large companies will also be nearly twice as likely as smaller companies to divest noncore assets over the next three years.

Current geopolitical trends are also impacting the industry's M&A outlook. China's vision to develop its homegrown chip business, coupled with America's goal to protect technology considered critical to national security, are integral factors. Chinese firms are focusing on organic growth, mainly driven by investment in domestic R&D. At the same time, current U.S. policy prevents most M&A activity with Chinese firms. As a result, when semiconductor assets go up for sale, Chinese firms are less likely to actively participate in the bidding process. With fewer bidders to drive up the price, overall valuations are stabilizing. Sell side expectations are becoming more tempered and reasonable, directly benefitting M&A buyers.

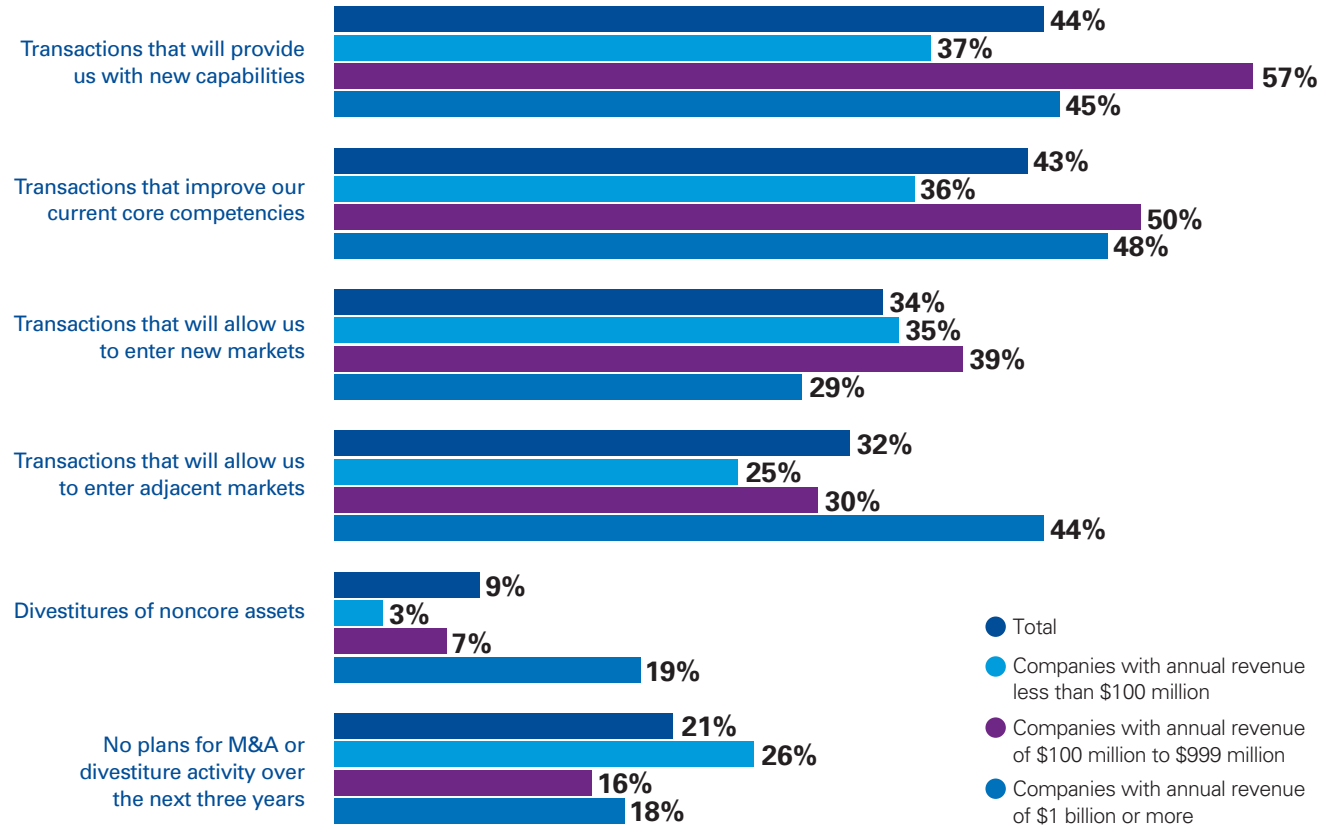
Strong revenue growth prospects, low borrowing costs, and an otherwise positive capital markets climate will help, too. Companies expect to have cash on hand, and they are willing to pay for assets that enable them to diversify their businesses into new growth areas.

3 Semiconductor Applications Forecaster (International Data Corporation, 2019)

4 Intel to acquire Mobileye (Intel, March 13, 2017)

5 Broadcom to Acquire CA Technologies for $18.9 Billion in Cash (Broadcom, July 11, 2018)

Type of M&A and/or divestiture activity predicted by semiconductor companies over the next three years



Multiple responses allowed; therefore, percentages do not sum to 100%.

Source: KPMG Global Semiconductor Industry Survey findings, 2020

"To capitalize on the convergence of the mega trends of IoT, 5G, AI, and autonomous vehicles, companies should expect to pay higher multiples for assets that can unlock value across their existing portfolio. This will require a different approach to M&A than the consolidation playbook traditionally leveraged by companies."

—Scott Jones, Principal,
Global Semiconductor practice,
KPMG LLP (U.S.)

New talent needed to fuel the future

"With the rapid convergence of technologies, surging demand for chip-level and system-level innovation, and faster time-to-market demands for new applications, attracting and retaining talent is a key priority. Semiconductor companies are hiring more software talent and systems companies are scouting talent in semiconductors."

—Shrikant Lokohare, Global vice president and executive director, GSA

Key takeaways

— A talent gap looms as chipmakers compete fiercely for hard-to-find talent in specialized high-tech areas.

— The increased protectionism mindset around the world is adding complexity and risk to the global semiconductor supply chain.

The quest for semiconductor talent is an important consequence of the emphasis on innovation and R&D. Internal talent development is crucial in the current environment where M&A levels are low and companies are not expanding their R&D capabilities through M&A. Lower levels of M&A require companies to focus more on internal innovation as opposed to periods of high M&A activity where companies are essentially buying talent, intellectual property (IP), and R&D capabilities.

Winning the future in semiconductor research, design, and manufacturing requires access to top high-tech talent. Realizing growth opportunities in new, untested areas depends on the talent to drive concepts into reality. Chipmakers are actively seeking uniquely skilled scientists and engineers capable of developing advanced semiconductor products for a very diverse set of applications including IoT, 5G, AI, and autonomous vehicles. Software developers are also in high demand as chipmakers shift to more service-oriented business models capable of meeting a broader range of customer needs and capturing a larger piece of the revenue pie.

But the global race for talent is fierce. Talent development and management ranks second among strategic priorities and are growing concerns of semiconductor executives compared to last year's survey. In addition, talent risk is the second biggest industry issue cited by all respondents and ranks first (by far) among smaller company respondents with annual revenues less than $100 million.

Companies are trying to staff up for growth mode, but the high-tech resource pool is thin. In America especially, the shortage of science, technology, engineering, and math (STEM) talent is becoming a crisis: The number of U.S. STEM jobs is projected to grow significantly[6] but millions may go unfilled due to a lack of qualified candidates. Universities around the world—and especially in the U.S.—simply aren't producing enough STEM talent. Other countries—led by India and China—continue to outpace the U.S. in awarding science and engineering degrees.[7]

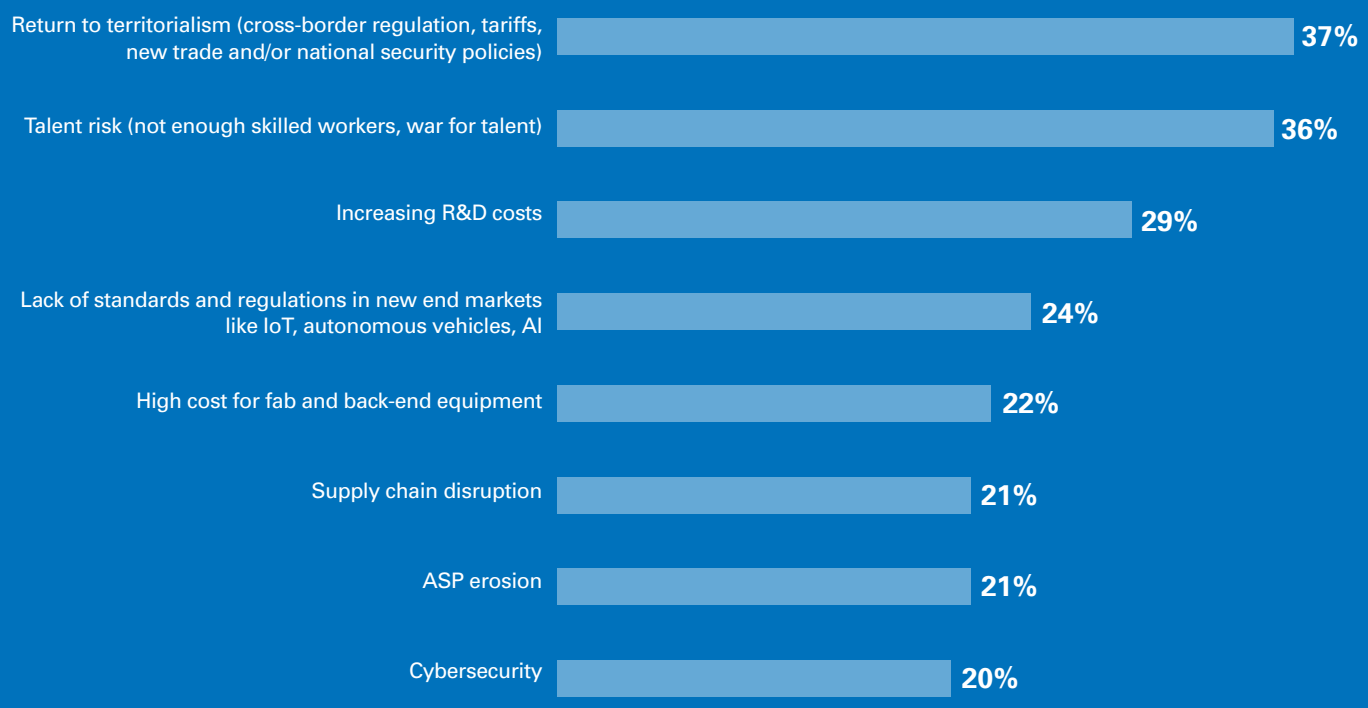
Startups and small businesses especially struggle to compete for finite talent resources. Established organizations can typically offer bigger salaries and better benefits. Companies are also increasingly focusing on the "employee experience" and becoming a workplace of choice. Innovative office design, flexible and remote working arrangements, and company culture play a bigger role today than ever before.

In addition, tech giants and platform companies are getting into the chip business, and as leading global players, they are often very attractive employers. More and more, they are enticing the best and brightest scientists and engineers from the traditional semiconductor industry to join their ranks. According to our survey, one of the primary impacts of tech giants developing their own chip capabilities is talent becoming more difficult to retain.

6 Spotlight on Statistics: STEM (Bureau of Labor Statistics, 2017)

7 Charting a course for success: America's strategy for STEM education (Committee on STEM Education of the National Science & Technology Council, December 2018)

Biggest issues facing the semiconductor industry during the next three years



Partial list shown.

Multiple responses allowed; therefore, percentages do not sum to 100%.

Source: KPMG Global Semiconductor Industry Survey findings, 2020

"The talent shortage is a direct threat to growth. There are simply not enough skilled workers to meet the future needs of the semiconductor industry."

—Chris Gentle, Partner,
Global Semiconductor practice,
KPMG LLP (U.S.)

New talent needed to fuel the future (continued)

To position themselves for continued growth, it will be critical for semiconductor companies to close the talent gap. As the workforce changes, current employees need to be upskilled and reskilled to meet new demands. Companies are rethinking their organizational design to best prepare for sustainable growth and thinking about developing career paths to best illustrate progression from hire to retire.

And they don't have to go it alone. Chipmakers can engage with government agencies and industry associations to work together to address the talent shortage. By collaborating on proactive measures—e.g., pooling resources to ensure more strategic investments in STEM education and creating more opportunities for high-tech trainees to gain on-the-job experience through internships, apprenticeships, and other programs—the industry can ready itself for the future.

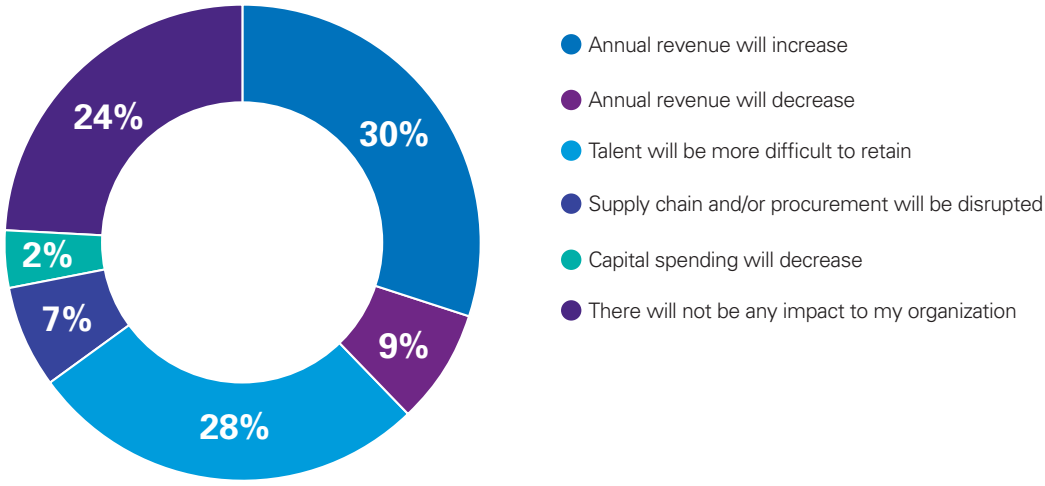
Research funding is another key component of developing the talent pipeline. The Semiconductor Industry Association (SIA), a U.S. industry association, called on the federal government to triple investments in semiconductor research, not only to advance new materials and designs, but also to grow the nation's innovative workforce.[8]

Territorialism and tariffs

Territorialism was virtually tied with talent management (37 percent vs. 36 percent) as the top industry issue. Managing new financial and operational risks that arise as the result of new cross-border tariffs and regulations is a growing challenge for semiconductor companies. These include U.S. tariffs on imported electronics, automobiles, and other consumer and industrial products that incorporate semiconductors, as well as counter tariffs by China on similar U.S. imports.

As tariff disruption creates industry cost pressures, semiconductor companies must make difficult financial choices, including whether to absorb additional costs or pass them on to customers. Supply chains are also feeling the effects, as chipmakers and their customers consider switching to vendors or manufacturing locations not subject to tariffs in order to reduce tariff risk. To learn more about the impact of tariffs on the semiconductor industry, see Part 1 of the Global Semiconductor Industry Outlook 2020.

As the tech giants and platform companies continue to develop their own chips and silicon capabilities, what do you expect the primary impact will be to your organization over the next three years?



Source: KPMG Global Semiconductor Industry Survey findings, 2020

8 Winning the Future: A Blueprint for Sustained U.S. Leadership in Semiconductor Technology (Semiconductor Industry Association, April 2019)

Related reading

Untapped opportunities for semiconductor companies

This report is part of KPMG's 15th annual Global Semiconductor Industry Outlook and focuses on financial and operational opportunities especially in the areas of R&D efficiency and tariff mitigation. Learn more at kpmg.com/untapped.

Technology convergence powers semiconductor growth

This report is part of KPMG's 15th annual Global Semiconductor Industry Outlook and focuses on the biggest growth opportunities for the industry, including the key products and applications that will drive future revenue. Learn more at kpmg.com/convergence.

Automotive semiconductors: the new ICE age

As we enter a new automotive age, cars will be differentiated by the functionality enabled by semiconductors and electronics. This shift places semiconductors—the building blocks of a car's "Internal Computing Engine"—at the heart of automotive innovation. That, in turn, is forcing a convergence of the semiconductor, computing, and automotive industries. For more information, please visit kpmg.com/automotive.

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