Untapped opportunities for semiconductor companies

R&D and tariff mitigation are potential sources of savings

Global Semiconductor Industry Outlook 2020

Part 1 of 3: Spotlight on finance and operations

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About the authors

Tim Zanni is the global and U.S. head of KPMG's Technology practice, leading KPMG's initiatives to deliver leading business advisory and accounting services to the global technology space. Prior to his current role, Tim served as managing partner of KPMG's Silicon Valley office for seven years. Tim has more than 35 years of experience in business development leadership and is a subject matter professional on disruptive trends and innovation hubs in the technology industry.

tjzanni@kpmg.com

Lincoln Clark is the leader of KPMG's Global Semiconductor practice and a member of KPMG in the United States' Technology, Media & Telecommunications practice. He has more than 32 years of experience providing auditing and accounting services, including as lead partner for a significant number of Fortune 500 companies. Lincoln has extensive experience working with semiconductor companies on IPOs, debt financings, acquisitions, and equity financing.

lincolnclark@kpmg.com

Chris Gentle is a partner in KPMG's Global Semiconductor practice and member of KPMG in the United States' Technology, Media & Telecommunications practice. He is also the Technology leader for the Silicon Valley practice. He has more than 20 years of experience providing financial statement audit and M&A financial due diligence services to public and private companies in the semiconductor, electronics, and software sectors.

christiangentle@kpmg.com

Scott Jones is a principal in KPMG's Global Semiconductor practice and a member of KPMG in the United States' Technology, Media & Telecommunications practice. He has more than 15 years of experience as a program manager in the semiconductor industry, equity analyst covering the semiconductor sector, and a consultant serving technology companies. Scott has delivered performance improvement services in areas such as R&D portfolio management, financial modeling of advanced technologies, M&A strategy, post-merger integration, and operating model transformation.

asjones@kpmg.com

Shrikant Lohokare, PhD, is global vice president and executive director of the Global Semiconductor Alliance (GSA), where he leads global operations and strategy and drives initiatives in an expanded ecosystem including semis, software, systems, solutions, services, and emerging markets. Shrikant is also an accomplished technology executive, entrepreneur, and investor. He has more than 20 years of leadership experience in hardware and software technology innovation, commercialization, new business incubation and scaling, operations management, corporate strategy, and business development for Fortune 500 corporations, venture-backed start-ups, and nonprofit organizations.

slohokare@gsaglobal.org

KPMG

Foreword

Welcome to Part 1 of KPMG's 15th annual Global Semiconductor Industry Outlook, focusing on financial and operational opportunities, especially in the areas of R&D efficiency and tariff mitigation.

Semiconductors continue to stand as the most powerful invention of the modern age. The core building block of today's high-tech and hyper-connected world, nearly every aspect of business and society depends on a healthy semiconductor ecosystem.

This report is the first in a series of three examining what the future holds for this vital industry. Part 1 focuses on financial and operational expectations and opportunities and the trends driving them. It also provides a confidence index reflecting semiconductor industry leaders' expectations about revenue, profitability, workforce growth, and spending.

Together with the other reports, this marks the 15th annual edition of KPMG's Global Semiconductor Industry Outlook. In it, we share key findings from a survey of semiconductor industry executives who represent the world's semiconductor companies and suppliers. Each year, our analysis helps semiconductor CEOs, COOs, CFOs, and other leaders understand key industry challenges and opportunities and fine-tune their strategies and operations accordingly.

As the semiconductor industry continues to drive technological advancements that transform how people live, businesses run, and economies grow, we hope this series of reports helps you prime your business for success.

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:

41% of R&D spending is not very efficiently aligned with the market, representing a billion-dollar opportunity

67% of semiconductor companies plan to pass some or all of tariff cost onto customers

58% of semiconductor companies plan to change operations or supply chain due to tariffs

59 Semiconductor Industry Confidence Index score for the upcoming year; showing healthy optimism by industry leaders

Key takeaways

— Most view 2019 as a blip in long-term industry performance. Expect growth in 2020, driven by the correction of the memory market.

— To capitalize on the recovery, strategically invest in equipment, technology, and talent, aligned to the highest growth opportunities.

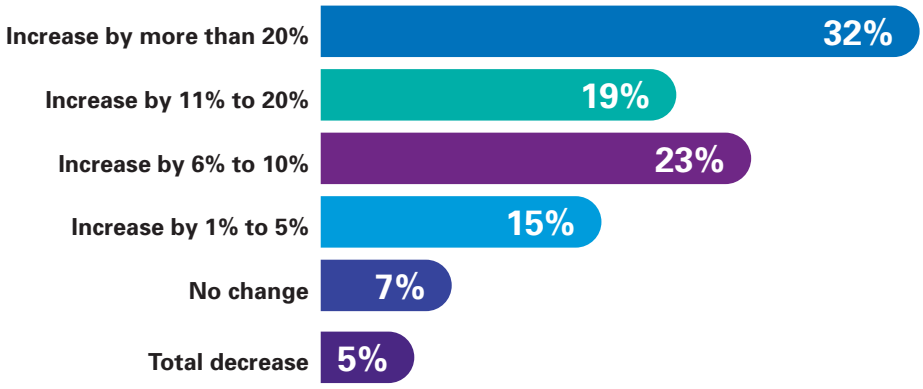
Semiconductor leaders are still optimistic despite a down year

Despite a down year in terms of revenue in 2019 and the ever-present specter of new tariffs, semiconductor leaders have a positive outlook for their companies' 2020 performance. This year's Semiconductor Industry Confidence Index score—based on respondents' one-year outlooks for their companies' annual change in revenue, operating profitability, workforce size, capital spending, and R&D spending—is a healthy 59.

The overall industry optimism isn't due to rose-colored glasses but rather recognition that the memory sector's 2019 underperformance—driven by down prices—was the primary factor depressing the rest of the industry in 2019. Absent memory, total semiconductor market performance would have been relatively flat.

KPMG's survey indicates that bigger companies with $1 billion or more in revenue that are tied to the hard-hit memory sector accept that the low mark has passed. Seeing signs of memory oversupply absorption, they are confident the sector will bounce back in 2020 and they even see growth ahead, though not as dramatic growth as smaller rivals. These traditional global semiconductor businesses are more diversified across slower growth sectors, and also more exposed to headwinds of the global economy—all factors that may mute their expectations for the coming year.

What is your outlook for your company's revenue growth over the next year compared to the current year?



Source: KPMG Global Semiconductor Industry Survey findings, 2020

Percentages may not equal 100% due to rounding.

Meanwhile, smaller companies with revenue under $100 million were never really threatened in 2019. Typically scaling their technologies across smaller share applications, their outlook isn't as affected by the industry-wide revenue slowdown. Indeed, smaller companies are especially confident in their outlook. These newer market entrants are typically more aligned to innovative chip applications such as Internet of Things (IoT), artificial intelligence (AI), 5G, and higher growth sectors such as automotive and communications.

For both big and small chipmakers, the 2020 revenue growth outlook is particularly healthy. With the recovery in full swing and prices ticking back up, nearly nine in ten (89 percent) semiconductor executives expect their companies' revenue to grow next year. And the degree of expected revenue growth is also significant. Among all companies, 74 percent of respondents expect their companies' annual revenue to increase by 6 percent or more. Among smaller companies in high-growth mode, 58 percent of respondents predict more than 20 percent revenue growth in 2020.

With the surplus of memory correcting itself and demand expected to creep back up, semiconductor businesses feel increasingly certain of an industry-wide comeback and are ready to capitalize. Most are planning to invest in equipment, software, and the workforce to help drive revenue growth in 2020. Nearly 6 out of 10 (59 percent) of chipmakers plan to increase capital spending and about three-quarters (73 percent) expect the size of their workforce to increase. And, with price erosion no longer a major concern, annual operating profitability expectations are also largely positive.

"While demand for memory drove a historic 2018, oversupply caused the bottom to fall out in 2019. But this is a mature industry with applications in virtually every piece of the connected global economy. It is already rebuilding on a strong foundation. With uncertainty waning, chipmakers and suppliers are preparing to get back to growth mode."

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

Semiconductor Industry Confidence Index

59

The KPMG Semiconductor Industry Confidence Index measures semiconductor executives' confidence in the industry. We calculate the confidence score from survey respondents' single-year outlooks for their companies' annual change in revenue, operating profitability, workforce size, capital spending, and R&D spending.

Index by company revenue

64
Less than $100M

58
$100M to $999M

52
$1B or more

R&D efficiency is a billion-dollar opportunity

In the rapidly evolving semiconductor industry, access to the latest materials, technologies, chip designs, and manufacturing processes has long been the basis of competition. But in today's hyper-connected world, R&D is a bigger priority than ever before—and a bigger expense.

For one, chipmakers are faced with supporting applications and end markets that are becoming increasingly complex. Second, tech platform companies are now designing their own chips in-house, challenging traditional semiconductor businesses to diversify their products and services. Third, the incremental costs of executing innovation—including hiring and retaining talent and developing specialized software—are rising, requiring higher levels of R&D investment to achieve the same goals and forcing chipmakers to make bigger bets on fewer designs.

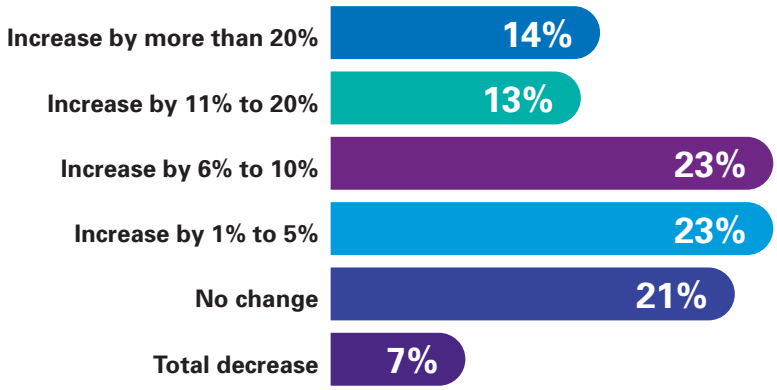
Given the market forces at play, it's little wonder global spending on R&D is huge, reaching a record $64 billion in 2018 and continuing its upward growth in 2019.[1] KPMG's survey also found that R&D is an area where semiconductor leaders expect to make big investments in 2020. Nearly three-quarters (73 percent) of respondents say their companies plan to bump up R&D spending in the next fiscal year, with 27 percent expecting it will increase by more than 10 percent.

But is increased R&D spending generating expected returns? Maybe not for everyone. R&D efficiency still has much room to improve. According our survey, nine percent of R&D spending is not efficiently aligned with market opportunities. Another 32 percent is also potentially suspect—tied to questionable products and programs that may never make it to market. This marks a step back in R&D efficiency since our 2018 survey.

Of course, a certain amount of R&D waste is expected and even acceptable. Like all creative endeavors, there is always some level of risk associated with innovation. Not every idea will receive adequate funding. Not every innovation will make it into the product portfolio. And not every new product will live up to its market potential. Every semiconductor company, no matter how sophisticated at R&D, will experience some failures.

Still, R&D misfires can't outweigh the successes. As expenditures add up, the risk of wasted R&D dollars will only grow larger, easily running into the billions if not tens of billions of dollars. Chipmakers need to spend more efficiently on R&D. They also need to make R&D processes more effective. This is a billion-dollar opportunity.

What is your expectation for the change in semiconductor R&D spending by your company for the next fiscal year over your current year?

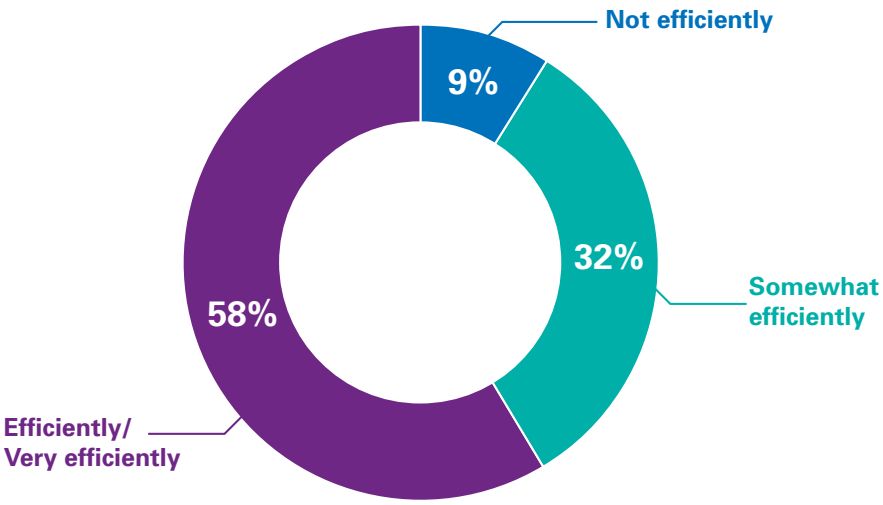


Source: KPMG Global Semiconductor Industry Survey findings, 2020

Percentages may not equal 100% due to rounding.

1 Semiconductor R&D Spending Will Step Up After Slowing (IC Insights, Jan. 31, 2019)

How efficiently is your R&D spending aligned with your market opportunities?



Source: KPMG Global Semiconductor Industry Survey findings, 2020
Percentages may not equal 100% due to rounding.

Agile portfolio management[2,3] can be a game-changer for semiconductor businesses looking to improve the R&D process, raise the return on innovation, and take some of the risk out of R&D. In a fast-moving industry facing market disruption and fierce competition, traditional approaches to prioritizing and funding business initiatives, such as annual planning and budgeting for R&D, won't be effective. Chipmakers need agile processes to spot the highest potential products among active and proposed projects and allocate resources to them.

Applying agile principles to portfolio management enables chipmakers to quickly reevaluate and reprioritize projects based on changing market conditions and customer demands. They're then able to increase speed to market and capitalize on emerging opportunities. Agile portfolio management also improves visibility into the innovation pipeline, helping chipmakers know when to cut hopeless projects and reallocate resources to the next highest value projects.

As semiconductor R&D costs rise, leveraging data and analytics (D&A)[4] in R&D processes will also help chipmakers optimize R&D, improve return on investment (ROI), and bring more profitable products to market faster. D&A capabilities are a fundamental piece of agile portfolio management, helping disparate product design teams unlock and share insights hidden in mounds of data, thereby improving productivity and shortening the overall design lifecycle.

"Making R&D more efficient will set semiconductor businesses apart. But be careful not to stifle all risk taking. Achieving perfect alignment would more than likely signal that leadership is overly focused on meeting known market needs—that they aren't thinking broadly enough about new prospects that would position the company for long-term growth."

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

Key takeaways

— As R&D investment increases, the risk of wasted R&D dollars will only grow larger, easily running into the billions of dollars.

— Make effective use of the R&D budget by embracing agile portfolio management, which helps align new innovations with emerging market needs and allocate resources to the highest potential opportunities.

2 How agile portfolio management can align performance with strategy—and transform your business (KPMG LLP, 2019)
3 The right to win in semiconductors (KPMG LLP, 2016)
4 Evolving the D&A of semiconductor R&D (KPMG LLP, 2017)

Shifts in global trade present opportunities

The current "me-first" trade environment presents significant challenges for the global semiconductor industry, and global tariffs and increased protectionism will likely continue to present headwinds against achieving expected revenue gains in 2020. Managing abrupt new trade costs is now a top-of-mind concern for business leaders.[5]

U.S. tariffs are the nexus of the global trade issue. Since 2018, the U.S. has implemented multiple rounds of tariffs on billions of dollars of imported products to correct perceived unfair trade practices, prevent theft of intellectual property, and protect U.S. industries and national security. The tariffs apply to numerous industrial materials and goods prevalent in semiconductor chips and end products like electronics and automobiles, increasing duty rates anywhere from 7.5 to 50 percent, depending on the category.[6]

Global tariff disruption increases cost pressures

The bulk of the U.S. tariffs target imports of Chinese origin, resulting in retaliatory tariffs by China on U.S. exports and further complicating the semiconductor industry's trading relationship with China. Tariffs on imported and exported components are directly impacting the cost of chip manufacturing. According to the KPMG survey, two-thirds (67 percent) of semiconductor companies will pass on some or all of the costs of tariffs onto customers.

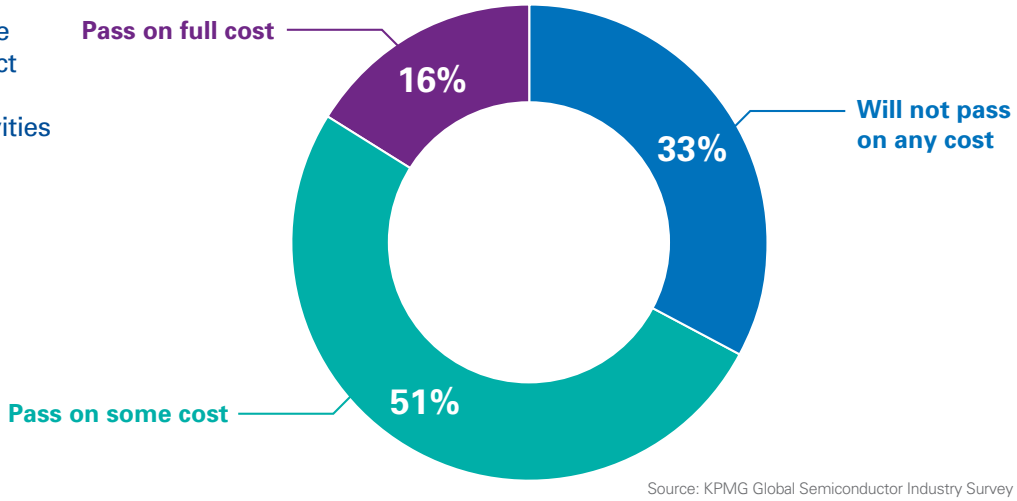
Larger chipmakers with more than $1 billion in revenue are more likely to pass through the costs of tariffs. With greater overall volume and more global supply chain operations, larger companies typically have substantial tariff liability. They are also more likely to be public and subject to shareholder pressures to deliver healthy quarterly returns, making it more essential for them to quickly recoup the costs of tariffs. In addition, large chipmakers' market share, design wins, and strong customer relationships earn them pricing power, reducing the risks associated with price increases to their customers.

Meanwhile, smaller companies with revenue under $100 million seem more hesitant to pass on tariff costs to customers. Moving fewer products through fewer suppliers, these companies may currently source in countries not impacted by tariffs today and therefore may not be suffering many extra costs. In addition, many often aren't fully established and must compete with bigger players on the basis of price. As such, they may view raising prices as the last option.

Supply chain implications

Tariffs are not just a financial issue. They are also introducing significant complexity to numerous processes throughout the supply chain, from inventory planning to logistics to customs clearance and compliance. To mitigate risk, 58 percent of semiconductor companies are considering some kind of operational response. The top actions will be sourcing new vendors from new geographies not impacted by tariffs and establishing incremental manufacturing and assembly locations away from sourcing locations subject to tariffs.

What do you expect the primary financial impact will be of the ongoing international tariff activities on your organization?



Source: KPMG Global Semiconductor Industry Survey findings, 2020

5 Global trade: The evolving world order (KPMG International, 2019)
6 Trump Administration Tariff Actions (Sections 201, 232, and 301): Frequently Asked Questions (Congressional Research Service, Feb. 22, 2019)

Large chipmakers seem more likely to make significant operational changes. With a global presence and facilities all over the world, they can mitigate tariff impacts without abandoning current operations. Rather, they can recalibrate the import balance from already available sourcing options. Moving manufacturing operations out of China and other impacted areas is more difficult and more expensive for smaller companies without an established global supply chain. They are less likely to pursue operational change in response to tariff activity.

Other tariff mitigation strategies

One thing appears certain–tariff risk is here to stay. While broader trade talks continue, trade resolutions don't appear complete and chipmakers must act quickly to adapt to this changing landscape.

The benefits of implementing tariff mitigation measures can be significant. According to a KPMG survey of more than 100 trade and operations executives across industries, companies that implemented a strategic tariff mitigation plan saved an average of 59 percent on tariffs into the U.S.,[7] and a re-optimized supply chain can have other cost and operational benefits beyond tariff mitigation.

Country of origin adjustment

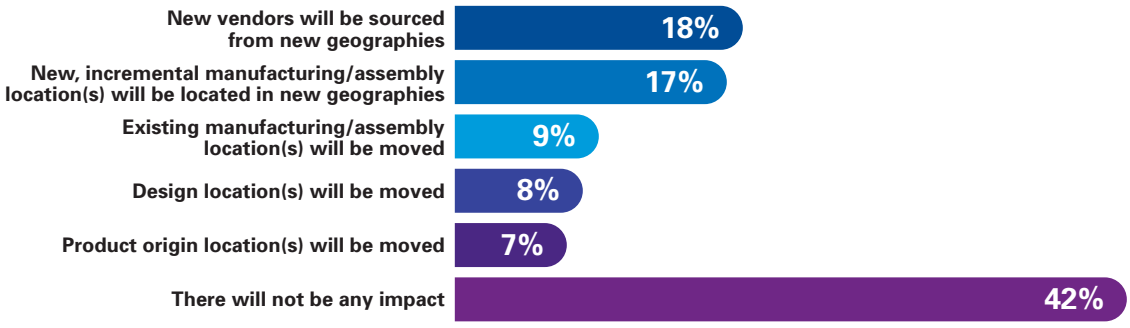
One way semiconductor companies can reduce tariff costs without wholesale disruption of the business is to strategically relocate operations in piecemeal fashion. Many semiconductor companies consider Taiwan, Vietnam, Malaysia, the Philippines, and other lower-cost Asian manufacturing locations as alternatives to China, while acknowledging that none can match China in terms of capacity and sophistication of manufacturing. Others are adopting dual and multi-origin strategies, which offer the flexibility to deliver into various markets from differing locations, depending on current tariff, free trade, and geographical factors.

However, in many cases, it may be possible to move certain steps of the manufacturing process out of China to lower-cost manufacturing locations and still result in a non-China origin product. Likewise, re-sourcing a key component or components from a non-China country while retaining final assembly or testing operations in China may also be sufficient to result in a non-China origin product in some cases. Product origin for imports in the U.S. is determined on a case-by-case basis according to a detailed review of relevant facts and circumstances, and tariff mitigation strategies involving the partial adjustment of product sourcing or manufacture should be carefully vetted prior to making significant investment.

Product exclusions

Another way semiconductor companies can reduce their tariff liability is to request exclusions from tariffs. Exclusions may be granted on three primary bases: (1) the tariffs will cause a severe financial harm to the importer or other downstream U.S. interests, (2) the product is not available outside of China in sufficient capacity or quality, or (3) the product is not relevant to China's "Made in China 2025" industrial initiative. The tariff exclusion process is complex–exclusions must be requested on a product-by-product basis and authorities demand a detailed demonstration of harm–but once an exclusion is granted, the potential benefits can be significant. Importantly, importers granted an exclusion may use the exclusion both on prospective imports and as a basis to reclaim duties that have already been paid since the date the tariff took effect.

What do you expect the primary operational impact will be of the ongoing international tariff activities on your organization?



Source: KPMG Global Semiconductor Industry Survey findings, 2020

Percentages may not equal 100% due to rounding.

7 How are tariffs impacting organizations? (KPMG LLP, 2019)

Shifts in global trade present opportunities (continued)

"The current global trade environment represents a potential reservoir of savings that can be tapped by revisiting tariff mitigation strategies and optimizing the global supply chain."

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

Value reduction programs

Third, because most tariffs are assessed on an ad valorem basis, importers may also consider options to reduce the value of imported products, thereby reducing the overall tariff liability. Examining existing product pricing and payment structures is recommended, and in some cases, expanded use of established programs such as the First Sale for Export program–which allows an importer to declare the "first sale" price of an imported article as the customs' value–may present significant savings.

Duty drawback

Finally, for any products destroyed in the U.S., used in U.S. manufacturing operations, or re-exported abroad after import into the U.S., the Duty Drawback program may allow for recovery of up to 99 percent of duties paid on qualifying items. Due to recent regulatory changes, the Drawback program is easier than ever to use. In today's tariff climate, many importers not previously concerned with tariff management are surprised to find they have significant savings opportunities available to them.

A note on export controls

In addition to the tariffs, U.S. authorities continue to take steps that further restrict U.S. chipmakers (and other companies) from doing business with China. Recently implemented policies range from sanctioning business dealings with specific Chinese tech firms (i.e., Huawei and ZTE[8]), increasing government scrutiny of visa applications and licensing authorizations necessary to employ foreign talent, and taking steps to expand the scope of U.S. jurisdiction over foreign products made with U.S. origin technology. These actions are impacting the semiconductor industry's ability to effectively do business not only in China but in the global marketplace. In the face of these challenges, semiconductor companies must truly understand their supply chain and sourcing strategies as they exist today—as well as opportunities for tomorrow—to be able to quickly maneuver and respond to the ever-changing global trade environment.

8 Huawei and ZTE Hit Hard as U.S. Moves Against Chinese Tech Firms (New York Times, April 2018)

Key takeaways-Managing tariff costs

With countries growing more concerned about protecting their industries, the trend toward eliminating tariffs has reversed. As tariff disputes escalate, companies can get caught in the middle, which increases costs. Here are some strategies for managing the impact.

Strategies for the near term

— Some leading companies are embracing southbound moves from China or even on-shoring options. Others are adopting dual and multi-origin strategies, which offer the flexibility to deliver into various markets from differing locations, depending on current tariff, free trade, and geographical factors.

— More than 50 methods are available to mitigate or recover new tariff costs. These involve, among others, tariff exclusions and re-classifications, customs valuation planning, and duty deferral and drawback programs.

— By bringing together product designers and supply chain and global trade professionals, companies can ensure the products they make are designed to relieve tariffs in the short term.

— KPMG's research indicates that companies actively seeking to mitigate tariff impact can ease their tariff burden by an average of 58 percent, depending on the industry and the company's appetite for refining its business processes.

Strategies for the long term

Businesses can prepare for the new strategic and operational challenges they may face in the years and decades ahead by:

— Integrating enterprise risk assessment with day-to-day operations so their strategic planning gives attention to geopolitical forces and their possible impacts.

— Using game boarding and scenario planning to evaluate the possible impact of these forces and determine their best options now and as the future unfolds.

— Understanding the behaviors of customers, suppliers, and competitors to help ensure that your cost structure and supply chain remain better than market.

— Ensuring the company's approach to trade compliance and costs issues aligns with its policy on tax responsibility and social contribution to the countries it operates in.

— Establishing strong governance for global trade management, including policies, minimum standards, global business processes, standard documentation, performance tracking, and reporting processes.

By investing in a flexible supply chain strategy and strong global trade management infrastructure and by basing their strategies on robust scenario planning, companies can sharpen their competitive advantage, no matter what the future holds.

About KPMG and the GSA

KPMG Global Semiconductor practice

Technology now touches virtually every aspect of our daily lives. The semiconductor industry is poised to capitalize on the digitized and connected world—if they make the right bets to manage unexpected disruptions and capture emerging opportunities. KPMG's Global Semiconductor practice is here to help semiconductor companies navigate this new world and come out ahead. Our international network of professionals works 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.

KPMG Global Strategy Group

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KPMG Trade & Customs Services

KPMG's extensive Trade & Customs (T&C) experience and network of over 400 professionals in 80 countries can help companies identify cost-savings opportunities around the world and manage compliance risks associated with supply chains and global trade operations. KPMG T&C professionals include former officials from customs and export authorities around the world; industry professionals, customs brokers, certified export and customs specialists; professionals with advanced degrees in business, economics, and law; and experienced trade technologists. Learn more at https://home.kpmg/xx/en/home/services/tax/global-indirect-tax/trade-and-customs.html.

Global Semiconductor Alliance (GSA)

GSA is where leaders meet to establish efficient, profitable, and sustainable semiconductor and high technology global ecosystems encompassing semiconductors, software, solutions, systems, and services. It is a leading industry organization that 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. GSA has an impressive global footprint representing over 30 countries and nearly 300 corporate members comprising top companies in the semiconductor industry. The global membership ranges from the most exciting emerging companies to industry stalwarts and technology leaders—representing 75 percent of industry revenues. To learn more about the GSA, please visit www.gsaglobal.org.

KPMG Supply Chain and Operations Services

Effective supply chain management can accelerate corporate growth and profitability, increase operational efficiency, and offer new and differentiated value to customers. KPMG's Supply Chain and Operations Services assist companies with a full range of process, technology, and people change levers essential to building durable competitive advantage. Our experienced advisers understand the complexities of designing and managing supply chains, and our strategic business approach helps create and sustain bottom-line value across the extended supply chain—from suppliers to customers. Learn more at https://advisory.kpmg.us/services/operations/supply-chain-operations.html.

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