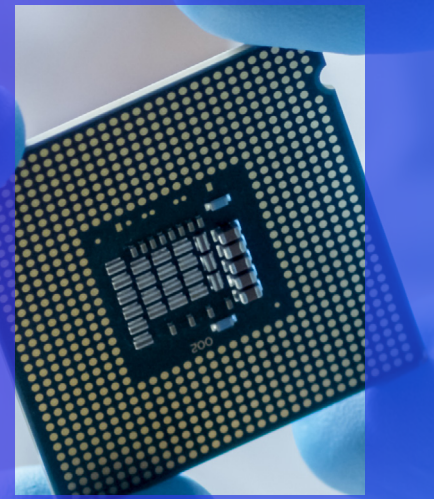




Automotive semiconductors – Accelerating into the new ICE age



In our 2019 paper, “[Automotive semiconductors: The new ICE age](#),” we laid out the opportunities and challenges for automotive semiconductor manufacturers and predicted the industry would reach \$200 billion by 2040. With electrification, autonomy, and other innovations, we noted that cars were becoming computers on wheels, making automotive one of the fastest growing segments in the semiconductor industry. 2021 turned out to be a record year both for the overall semiconductor industry as a whole and for the automotive segment, despite unprecedented supply chain challenges. Given these developments we now predict the automotive segment will reach \$200 billion sooner and surpass \$250 billion by 2040.

A blockbuster year for the semiconductor industry

- **Record sales.** 2021 was a record year for the global semiconductor industry, with sales growing to more than \$550 billion, a 25.6 percent increase over 2020.¹ We expect double-digit growth in 2022 as well, despite the continued supply chain challenges (Exhibit 1).

Exhibit 2. The KPMG Semiconductor Industry Confidence Index reached the highest value in 17 years

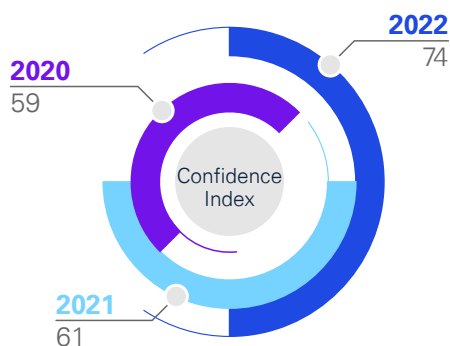
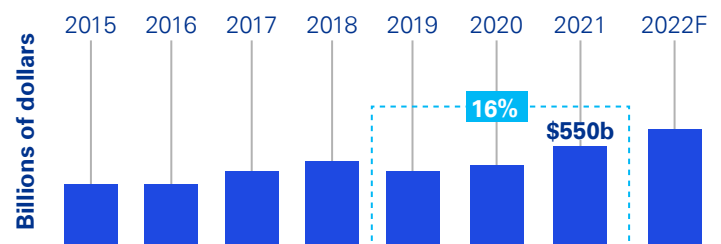


Exhibit 1. Global Semiconductor sales surpassed \$550 billion in 2021



Source: WSTS, World Semiconductor Trade Statistics

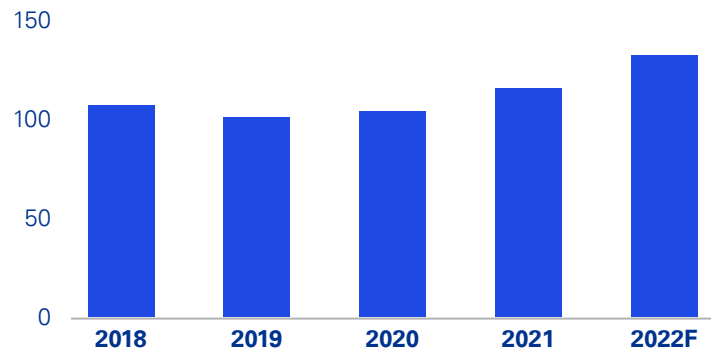
- **Record confidence.** Our predictions are based on a variety of market signals as well as the results of the KPMG Global Semiconductor Industry Outlook.² In the study, confidence among semiconductor leaders was the highest recorded in the 17 years we have conducted the survey (Exhibit 2). The confidence index indicates expectations for growth in revenue, capital spending and hiring).

¹ Source: “Global Semiconductor Sales Increase 24 Percent Year-to-Year in October; Annual Sales Projected to Increase 26 percent in 2021, Exceed \$600 Billion in 2022,” Semiconductor Industry Association, December 23, 2021

² Source “[Global semiconductor industry outlook 2022](#),” KPMG LLP, 2022

- **Additional capacity.** New capacity is being added worldwide supported by both private and government investments (Exhibit 3). In 2021, TSMC, the largest foundry service in the world, pledged to invest \$100 billion over three years. Intel continues to raise the bar by committing to capacity investments, either directly or via acquisitions.³ While there is always a risk of overcapacity, this time growth is supported by demand in multiple end markets, from consumer electronics to connected infrastructure, to IoT devices and autonomous and electric cars. This should reduce the risk of overcapacity.

Exhibit 3. Semiconductor CapEx (billions \$)



Source: Research reports, KPMG analysis

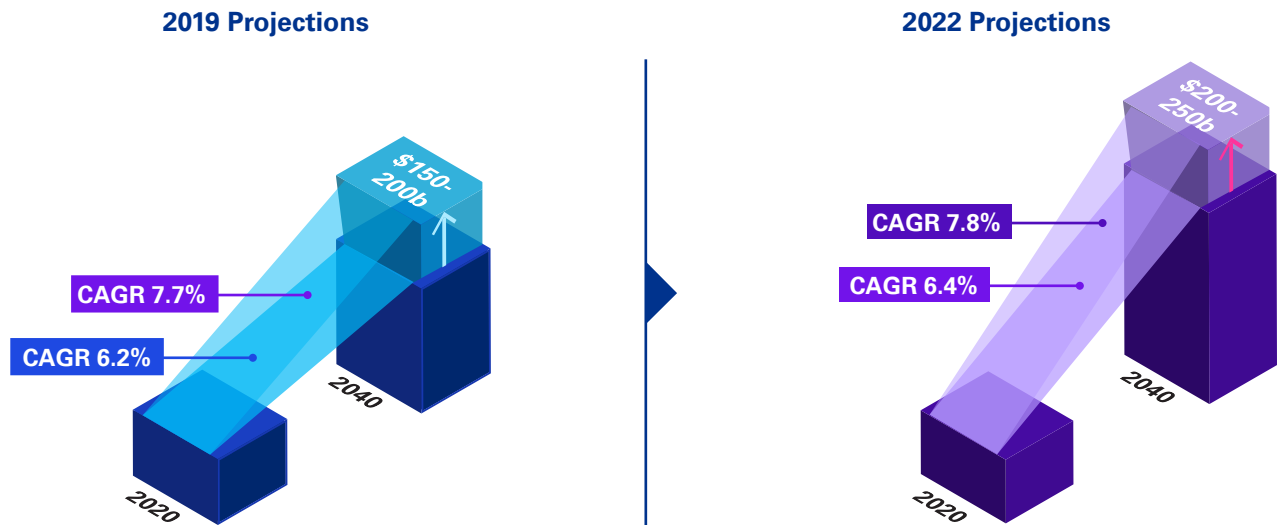
A transformative year for the automotive semiconductor sector

The automotive semiconductor sector is now on an even faster growth path than we anticipated in 2019. KPMG now expects global sales to reach \$200 billion by the mid-2030s, rather than in 2040.⁴ Our new projection for 2040 is for sales to surpass \$250 billion (Exhibit 4).

In the short term, demand for more advanced vehicles is driven by two factors: chip shortages prompted automakers to prioritize higher-priced luxury vehicles⁵ that use more electronics per car. And now, the spike in oil prices is accelerating the demand for electric cars.

In the long term, automotive semiconductor demand should remain strong and may surpass even the most optimistic projections. This is due to a combination of factors: increased vehicle production, accelerated adoption of electric and hybrid power trains, wider use of autonomous/assisted driving technology, and the more complex on-board electronics.

Exhibit 4: A brighter future for Automotive Semiconductors



Source: KPMG

³ Source: "Intel to Acquire Tower Semiconductor for \$5.4 Billion," Intel.com, February 15, 2022

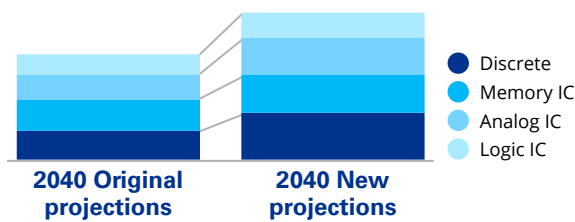
⁴ Source, "Automotive Semiconductors: The new ICE age," KPMG LLP, January 28, =2021

⁵ Source: Peter Sigal, "Mercedes loses premium sales crown to BMW, as chip shortage hits deliveries," Automotive News Europe, January 7, 2022

ADAS, infotainment, and electric power trains will be the leading applications. As ADAS/infotainment systems become more complex, they will require more and more processing, communication, and storage capabilities. Accelerating EV sales will drive increased demand for electric power train electronics (Exhibit 5).

As a result, logic, memory, analog and discrete semiconductors used in automotive applications will also see the highest growth (Exhibit 6).

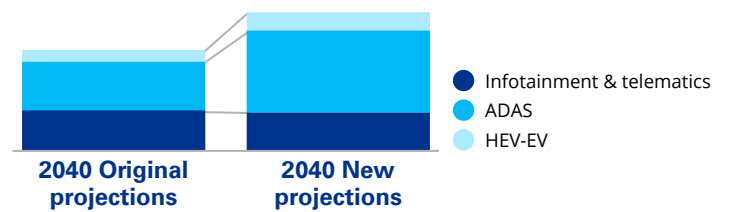
Exhibit 6: Sales of logic, memory, analog, and discrete devices are the biggest opportunity



Source KPMG



Exhibit 5: ADAS, Infotainment and Electric Cars applications are driving the surge



(Source KPMG Insights)

Strong confidence in the automotive sector among executives is clearly reflected in the latest KPMG Global Semiconductor Industry Outlook. Automotive applications continue to grow in importance for executives and are expected to be the number 2 growth driver for 2022 (Exhibit 7).

Exhibit 7. Executives expect automotive to be the second highest growth driver in 2022

Applications in order of importance (1=low growth and 5=high growth), average of responses

	2020 Outlook	2021 Outlook	2022 Outlook
Wireless communications (including 5G)	3.7	3.8	4.0
Automotive	3.5	3.6	3.8
Internet of things	3.7	3.8	3.6
Artificial intelligence	3.3	3.3	3.5
Cloud computing/ data centers	3.1	3.2	3.4

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

⁶ Source "Global semiconductor industry outlook 2022," KPMG LLPP, February 22, 2022

What can automakers and Tier 1 suppliers do?

Automakers are taking a much more strategic view of semiconductor sourcing and supply chains, and are partnering with suppliers all along the value chain. Nevertheless, we believe that automotive manufacturers need to be even more involved in the semiconductor value chain. Here are four ways this can happen:



Consider radical transformation

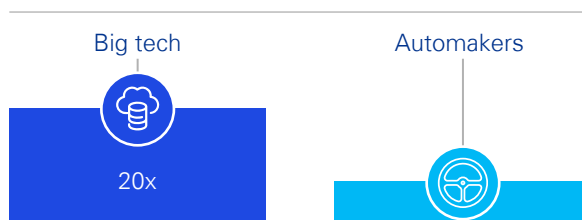
We observe that not all players are considering supply-chain transformations beyond what is needed to resolve the current shortage. A more comprehensive approach is called for. First, automotive semiconductor customers must fully understand the impact on future demand of new applications, some of which could place automakers in direct competition for chips with high-volume consumer players. Second, automakers can adopt a more holistic design philosophy that would standardize/simplify semiconductors selection.



Hire and retain specialized semiconductor talent

Automakers will benefit from hiring and retaining semiconductor experts to develop specific high-performance components and to better manage the supply. Software semiconductor engineers will be especially important as software-determined hardware is becoming more and more common. The contest for talent with tech companies will likely intensify. Automakers say they are adding tech talent, but Exhibit 8 shows that big-tech companies had 20 times as many job listings as automakers on a tech job site on a single day.⁷

Exhibit 8. The contest for talent



Change the organizational setup

Designing and optimizing autonomous and electric vehicles requires a more agile and integrated approach compared to the one used in the traditional automotive OEMs supply chain. We are starting to see major players splitting out their EV divisions⁸ to speed up the transition. An organizational change of this magnitude requires courage and careful planning and implementation.



Consider data and data strategy as a source of differentiation

As cars become more like computers on wheels, there is the risk that hardware itself (the vehicle) will lose its prominence in consumer thinking; they may look at processing speeds, bandwidth, and data, rather than horsepower.⁹

Automakers should understand what data need to be collected, who owns it, and how to use it beyond the immediate car operation. Automakers should think about the data partnerships and alliances needed for the chosen business model to succeed. The end game is not defined yet and multiple successful routes are possible—and all will require concerted and strategic transformation.

⁷ Source: Silicon on Careers, February 28, 2022

⁸ Source, Neal Boudette, "Ford Splits Into Electric and Gas Divisions to Speed Up Transition," The New York Times, March 2, 2022

⁹ Source: "Automotive semiconductors: The new ICE age," KPMG LLP, 2019

How can KPMG help

Semiconductor and technology industry services:

From the newest start-ups to industry giants, technology companies face unique strategic and operating challenges. The technology and semiconductor professionals at KPMG combine industry knowledge with technical experience to provide insights that help technology leaders deal with their complex business models. Our professionals go beyond today's challenges to anticipate the potential long and short-term consequences of shifting business, financial, and technology strategies.

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. It's needed across all industries amid today's ever-changing technological, economic, and regulatory challenges.

KPMG understands 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:

[KPMG Semiconductor Global Practice](#)

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