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Beyond the core: Identifying new segments for growth through value-chain partners

A systematic process for assessing supplier and customer capabilities and relationships can help semiconductor companies identify adjacent markets and promising opportunities.

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It is becoming increasingly difficult for semiconductor players across all sectors—whether in manufacturing, capital equipment, or chip design—to find business opportunities beyond their core customers and products. The current economics of the industry simply do not support companies' efforts to dabble in new areas. The necessary investments in the core carry a high price tag. The costs of creating new platforms, engineering for the next node dimension, or developing new integrated-circuit (IC) designs are now reaching the billions. And most of the new market segments targeted by chip and equipment manufacturers will inevitably have significant barriers to entry—not the least of which are unfamiliar operating models and sales channels, and aggressive incumbents.

Given these challenges, some companies are looking for growth opportunities closer to home and finding unexpected resources in their existing networks. They are partnering with suppliers and customers who participate in adjacent market segments or acquiring technology from elsewhere within the value chain (Exhibit 1). Intel did just that with its 2010 acquisition of McAfee, a deal that many in the mainstream and technology trade press described as a strategic move by the chip maker to grow "outside of the PC and computer server

markets" and gain a toehold in smartphones and consumer electronics.[1] There have also been several large, high-profile deals in the market for NAND flash-memory technology among vendors looking to broaden their customer base (Exhibit 2).

Based on our work over the years with a number of global semiconductor companies and our research on mergers and acquisitions in high tech, we have identified a process for assessing potential opportunities for growth through value-chain relationships, partner capabilities, and adjacent applications. In this article, we focus on ways to create opportunities among suppliers. It is typically easier for semiconductor companies to look upstream first because they will inherently understand their suppliers' businesses better. By contrast, an evaluation of customer-focused opportunities will likely require more time and resources.

There are three steps semiconductor companies can take to spot growth opportunities: identify the complementary market segments that could provide growth, identify the suppliers and technologies that could provide access to those segments and determine the right mechanism by which to grow—for example, will it be through partnership or an acquisition?

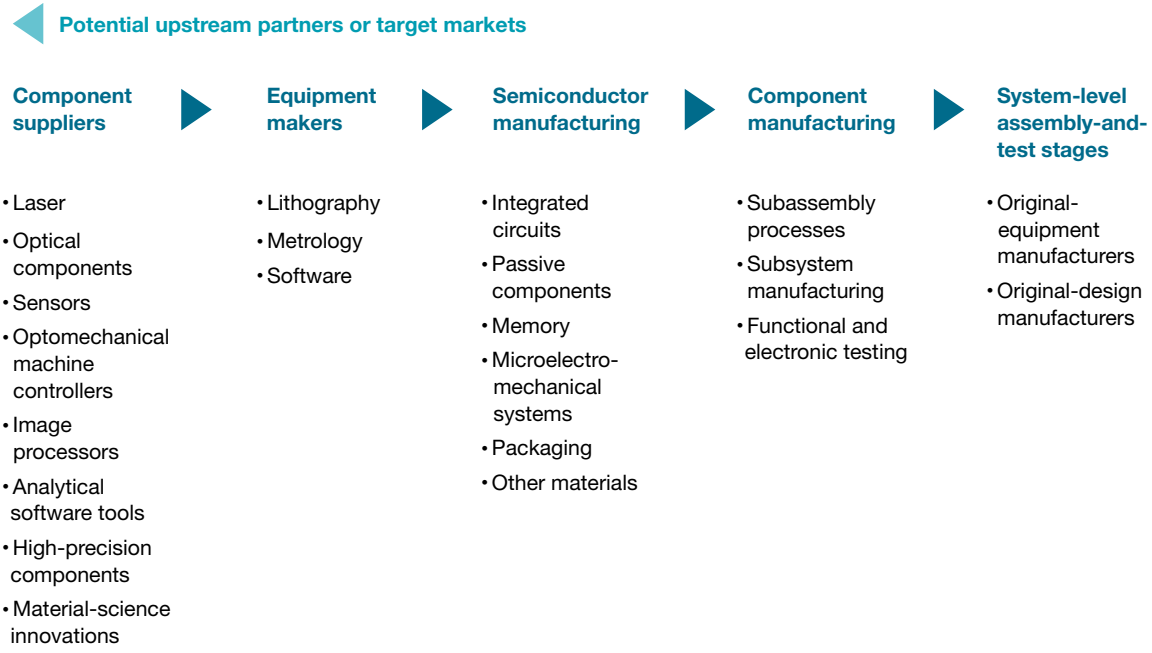
Companies may perform the first step routinely as part of their strategic-planning processes; however, they are less likely to tackle the second step with the diligence required to understand which new market segments a target or partner company can help usher them into. It is relatively straightforward to understand the products and services a target can offer you as a customer. But what capabilities are behind those offerings? What patents and technologies does the supplier hold that can generate growth for your company in adjacent markets? What sort of competitive advantage does the supplier hold in markets that might be of interest to your company? The research and conversations associated with the first two steps can help nudge semiconductor executives outside their comfort zones, while the third step will likely raise larger strategic and resource questions as companies begin to view their value-chain partners in a very different light.

Identify complementary market segments

Semiconductor companies can kick off the search by casting a wide net, as they would at the beginning of any strategic initiative. This means taking an exhaustive inventory of all the technologies and capabilities that their suppliers provide and considering how those assets could be applied in other market segments. For instance, an equipment manufacturer may discover that the technologies it uses in its wafer-inspection machinery can also be applied in the nondestructive testing schemes deployed in the aerospace or automotive industries. Or a company may recognize that the technologies it uses to produce the ingots that are at the core of its integrated circuits can also be used to produce solar-photovoltaic cells. The company's inventorying process could generate a healthy list of potential growth areas. But before making a move, semiconductor players should also consider how similar the potential target-market segments are to their current businesses. For example, are product-development processes and standards in the photovoltaic-cell market similar to those used in standard IC development? If so, the company's likelihood of success in that market will be higher because of the company's

Exhibit 1

Some companies are finding growth opportunities in the supply chain.



familiarity with critical aspects of the new market. The inventorying process can help the company focus on potential growth areas that are beyond its core but do not stray too far from its existing competencies and experience.

Find the right supplier

Once it has a market segment in mind, the semiconductor player must then determine which supplier, or set of suppliers, can provide a differentiating platform or infrastructure. There are a number of factors the semiconductor player should consider when determining who to target or partner with—among them, the company's level of spending with the supplier, the supplier's competitive position and revenue growth, and the compatibility and strength of the supplier's intellectual-property (IP) portfolio (for instance, the number of patents it holds inside and outside of the target market segment) compared with the manufacturer's own IP (see sidebar, "Using recursive- growth analysis to move beyond core markets").

A look at the supplier's business model and sales channels could also reveal potential alignment. Let's consider a semiconductor company whose business model is centered on the initial sale of manufacturing equipment. In its scan of suppliers, the company sees several potential partners that are focused on the long-term servicing and sale of replacement components. Partnering with or acquiring these suppliers would require the semiconductor company to develop new capabilities in its sales force and supply chain—so these players would likely not be an immediate priority (unless the semiconductor player is ready to make large investments in

sales and logistics), and the choices and opportunities could be narrowed further.

A chief consideration when picking a supplier as a partner (or target) should be minimizing the changes required to succeed in the new segment. Semiconductor executives must also consider the regulatory environments of the market segments they are targeting and their potential risk exposure—the costs of noncompliance could be very different depending on prevailing industry mandates. For instance, a company's proposed use of a product or technology in a new healthcare segment might not just benefit from but actually require partnership with a core supplier that understands the US Food and Drug Administration approvals that might be needed to bring the idea to market.

To perform a comprehensive assessment of the opportunities, the company will need input from across all functions, including business-unit representatives and executives in finance, IT, procurement, and strategy.

Determine the most effective mechanism for growth

Once the company has identified a priority supplier, or set of suppliers, it needs to decide how it will gain access to that player's technology or platform—that is, will it be through acquisition or partnership? There are a range of factors to consider. An acquisition may be a good choice if the semiconductor player can immediately capitalize on the technology acquired from a target company, and in cases where exclusivity

Exhibit 2

A number of companies have made acquisitions in the NAND flash-memory market.

Acquirer	Target	Date	Value	Details
SanDisk	**Fusion-io**	July 2014	$1.1 billion	Important elements included flash-storage systems, enterprise solid-state drives (SSDs), and flash software
SK Hynix	**Softeq**	June 2014	N/A	SK Hynix acquired the NAND firmware arm of Softeq to strengthen its flash-controller solution
Toshiba	**OCZ Storage Solutions**	Jan 2014	$35 million	Toshiba acquired OCZ assets (including intellectual property relating to the Indilinx controller) after OCZ filed for bankruptcy
SanDisk	**SMART Storage Systems**	Aug 2013	$307 million	Acquisition included serial ATA and serial attached SCSI enterprise SSDs
IBM	**Texas Memory Systems**	Oct 2012	N/A	Deal involved enterprise SSDs and multilevel-cell flash technology

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Using recursive-growth analysis to move beyond core markets

Advanced analytics and big data can be powerful tools for identifying growth opportunities beyond the core. Using them can make it easier for semiconductor players to identify potential acquisition targets by assessing information relating to company patents, revenues, products, and other critical identifiers. A thorough analysis of public and proprietary patent databases, for instance, can provide insights not only into the quantity and quality of patents owned by a particular company but also about the shifts in the patent landscape over time. Semiconductor players may be able to evaluate how a potential target's patent portfolio stacks up against other players' patent collections, the respective players' areas of focus, and the applicability of their intellectual property across various market segments.

One particular methodology developed by McKinsey, recursive-growth analysis, takes the user through several "degrees of separation" in markets and products to identify less-obvious expansion possibilities—ones that are far from the company's core segments but that still optimize and build upon core capabilities. This methodology draws on a database of growth activities pursued by more than 200,000 companies across 2,000 industries worldwide, as well as some 600,000 financial records that have been mined to estimate and visualize growth and profitability in particular areas. Using recursive-growth analysis, the semiconductor player identifies peer and target companies or business units and an initial set of markets in which peers may be active but the company is not. The process is repeated, allowing the semiconductor player to rank and further explore opportunities uncovered during each pass. The exhibit provides an example of just such an exercise performed by a company with expertise in semiconductor-testing equipment looking to move beyond its core market.

Exhibit

Recursive-growth analysis can identify opportunities beyond core markets.

The recursive-growth tool generates a wheel of activities and market segments radiating from a company's core capabilities (darker segments) in the center to unexplored opportunities at the edges (lighter segments).

and control of IP are important to build or maintain competitive advantage; the semiconductor player would gain immediate ownership of the supplier's technologies, sales channels, and personnel.

By contrast, partnering may be the right choice if there would be antitrust issues associated with an acquisition, if the cost of acquisition would be too high, or if only a portion of the supplier's business is attractive to the semiconductor company but the supplier is unwilling to carve it out from its core operations. Partnering rather than acquiring may be also be desirable if the venture would be risky—for instance, where the market is still nascent or where the technology is not proven.

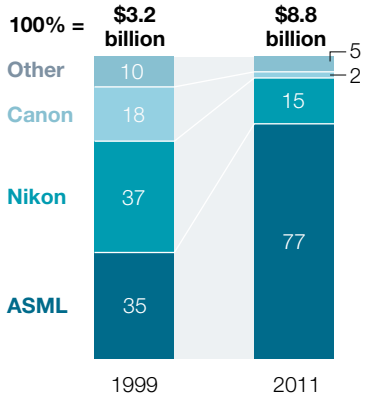
Let's consider two examples that highlight the different mechanisms:

ASML acquires Cymer. Dutch-based ASML, over the past ten years, has emerged as a leading provider in the rapidly evolving market for photolithography systems and equipment. Among its competitors, only Nikon has retained a market share above 10 percent over that period (Exhibit 3). Photolithography tools typically cost upward of $40 million per unit. Next-generation extreme-ultraviolet-light tools are expected to cost between $80 million and $120 million per unit. Only a few device and equipment manufacturers will be able to sustain these high product-development costs long term.

Exhibit 3

ASML has increased its share of the market for photolithography systems and equipment.

Core players in wafer-fabrication lithography equipment,
% of market[1]

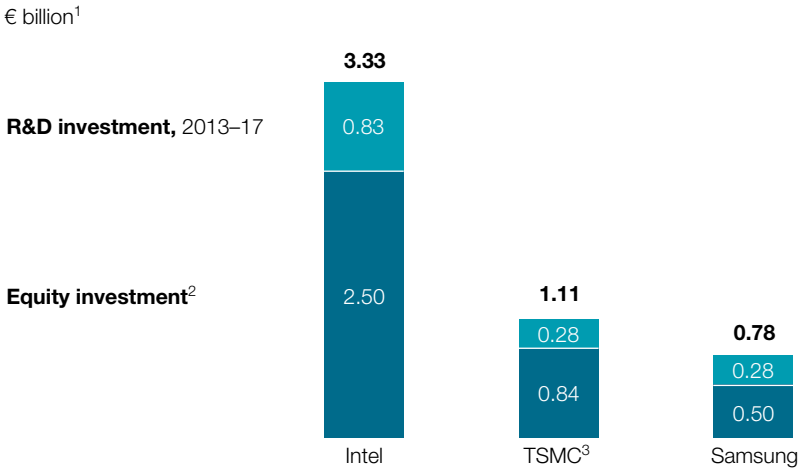


[1]Figures may not sum to 100%, because of rounding.

Source: Strategy Analytics, 2012

Exhibit 4

Industry investments ensure that innovation continues in extreme-ultraviolet-light technology.



[1]Figures have been rounded up.
[2]One-time payment.
[3]Taiwan Semiconductor Manufacturing Company.

Source: *The McClean Report*, IC Insights, 2014, icinsights.com; *Solid State Technology*, 2014

In this environment, ASML targeted laser maker Cymer in a cash-and-stock deal valued at about $4 billion. In announcing the news, ASML suggested the deal would help to accelerate the development and commercialization of extreme-ultraviolet-light sources, a critical technology for enabling the continued downscaling of transistor-node size.[2] Cymer and Japan-based Gigaphoton shared the market for deep-ultraviolet-excimer lasers for photolithography, and both had been developing extreme-ultraviolet sources for several years using laser-produced plasma. But, according to company officials, the light-source technology that Cymer owned was central to ASML's growth plans. The company also gained access to a number of potential new partners, namely Cymer businesses that supply optics to LCD and organic-light-emitting-diode manufacturers.

Manufacturers partner with ASML. In July 2012 ASML announced a customer coinvestment program to enable minority investments in ASML to support and accelerate the company's research and development of new technologies for extreme-ultraviolet lithography and the fabrication of 450-millimeter wafers. Intel was the first to sign on, and Samsung and TSMC joined in August 2012, with their combined investments totaling €5.2 billion (Exhibit 4). The partnerships reflect a realization among industry players that productivity improvements and growth in semiconductor manufacturing have traditionally

come from increasing the diameter of silicon wafers—and, more recently, from the accelerating change in enhanced lithography technologies such as immersion lithography, deep-ultraviolet-light sources, and the extreme-ultraviolet-light sources described earlier. But there are high development costs associated with these still-nascent technologies. When announcing the program, ASML noted that the collaboration spreads financial, R&D, and implementation risks among multiple parties and enhances the company's ability to improve shareholder and customer value.

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The environment for technology companies has been difficult the past few years. The industry has always been cyclical, but it is absolutely possible that the current slow-growth environment is now the new normal. The companies that are best able to ferret out the opportunities in their supply chains and find seemingly elusive pockets of growth will have the advantage.

[1] Ashlee Vance, "With McAfee deal, Intel looks for edge," *New York Times*, August 19, 2010, nytimes.com.
[2] Roberta Cowan, "Chip gear maker ASML buys Cymer for $2.5 billion," *Reuters*, October 17, 2012, reuters.com.

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