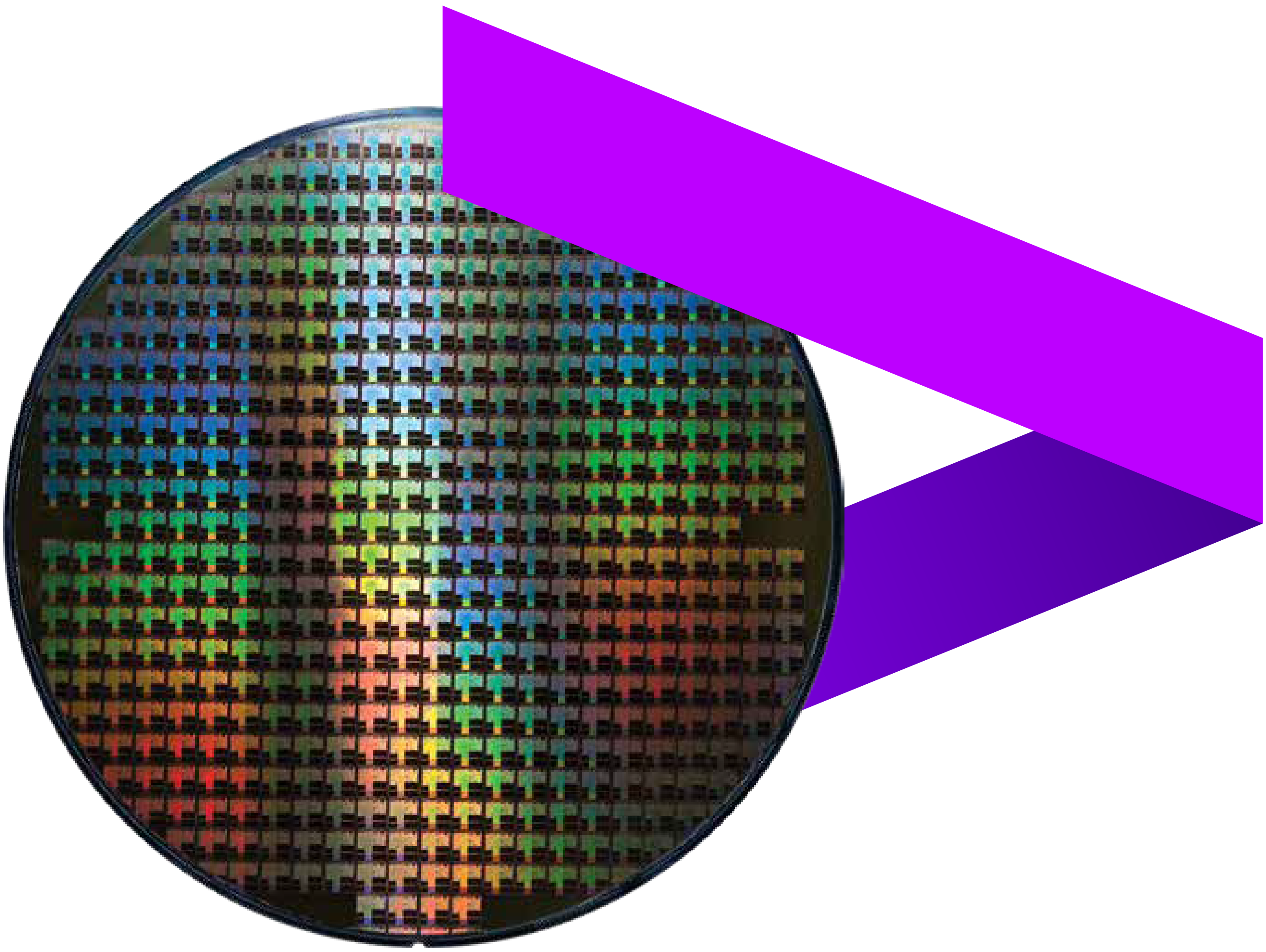
SEMICONDUCTORS
LEADING IN THE NEW



The rapid development of the semiconductor market over the last 20 years has been characterized by major changes in customer demands. From the PC boom to smartphones, and now IoT and driverless cars, the industry has summoned a 'new' approach over the past two decades.

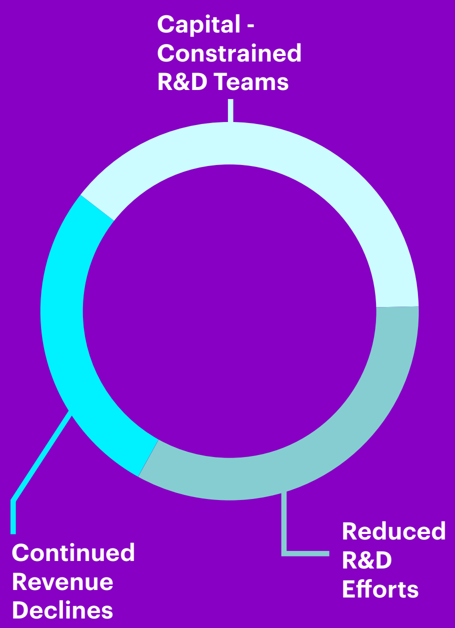
However, has the industry itself been equally successful in 'leading in the new'? Specifically, has it been able to create profitable and sustainable companies that can navigate through perpetual change? Achieving that end requires companies to find new areas of technology and new applications that can create entirely new revenue streams and profits. At the same time, existing technologies and business models need to be reapplied to new tech sectors that can generate sustainable financial performance.

To find out how well companies in the semiconductor industry have been able to achieve these twin goals, we examined the industry's ability to balance investments into present and future businesses. Our analysis revealed a number of significant challenges and trends.

DECLINING RETURNS ON R&D INVESTMENT

One of the most pressing challenges that we identified is the decline across the industry over time of the growth returned from each dollar invested. While that's not the case across the entire sector, it's generally the case that R&D costs are increasing—as much as 60% for some companies—while revenue growth is slowing for many of them.

Revenue / Investment



36 of the largest companies globally, including 9 fabless, 2 foundries, 18 IDMs and 7 semiconductor equipment providers.

Source of financial data: S&P CapitalIQ

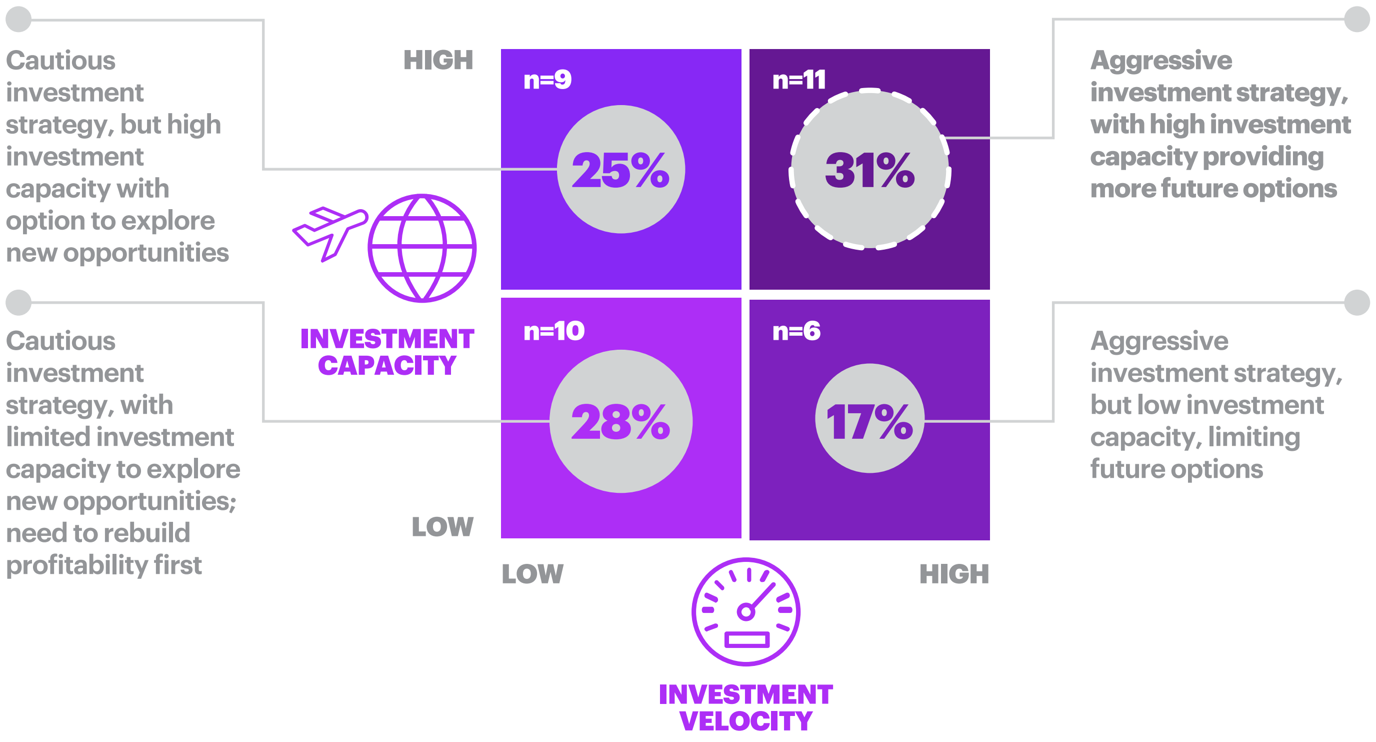
A FRAMEWORK FOR GAUGING SUCCESS IN A NEW MARKETPLACE

So, how can companies avoid this potential 'innovation death spiral?' To find out, our analysis investigated how successful companies have been in marrying their investments in innovation (both how much and where it's directed) with a commitment to sustaining core products that can underpin sustainable financial performance.

Using this framework has enabled us to create a categorization of industry players based on their pivot intensity, i.e. how quickly they will be able to rotate to the new.

OUR RESEARCH SHOWS THAT ONLY 31% OF COMPANIES ARE UTILIZING THEIR INVESTMENT CAPACITY TO FUEL GROWTH

Pivot intensity: Investment Capacity vs. Investment Velocity
(Sample: n=36 companies in the semiconductor industry)



Analysis of our results show that 30 percent of the analyzed companies are utilizing their investment capacity to fuel growth. These companies are predominantly fabless and IDM companies.

Additionally, we found that there was no relationship between the capacity to invest in innovation and the rate of return of said innovation. In other words, both large and small companies can be successful leaders in this evolving, dynamic market. Ultimately, the scale of a company and its investments will not necessarily drive the speed at which ROI is realized.

Size, however, does tend to influence the direction of investment in innovation. We found that smaller companies were often pivoting to new products, while their larger counterparts tended to direct investment at their core business. Nonetheless, higher performers were those that struck a balance between the two areas regardless of size.

Such balance is at the heart of leadership in the marketplace. Businesses that succeed here are those that can renew and transform their core business, while simultaneously moving into new businesses and industries.

Three strategic imperatives that enable companies to rotate to the new

1 Transform the core business.
An organization must increase efficiency and maximize profits from its core business to build investment capacity.

2 Invest for core business growth.
Rather than spending all of the new profits on the new business, the company must dedicate a portion to driving incremental growth in the core business.

3 Scale the new business.
This requires investing the balance of investment capital in creating an innovation architecture that enables the new business to make the transition from concept to mass market.

KEY STEPS COMPANIES MUST TAKE TO LEAD IN A NEW MARKETPLACE

For each type of business that we've identified, there are some useful lessons that they will need to learn as they develop their own strategies to lead in this evolving, dynamic marketplace.

Those businesses that we categorized as having 'cautious investment strategies, but high investment capacities (with options to explore new opportunities)' should guard against complacency. The rate of change driving the semiconductor industry means that failing to investigate the evolving marketplace now could prove costly in the longer term. Their strategies should direct investment into new markets as soon as possible.

Those businesses with 'cautious investment strategies, with limited investment capacities to explore new opportunities,' need to rebuild profitability first. They should heed the warning of declining financial performance and take action to arrest further attrition. Redefining their current business model and/or breaking into new markets by investing in innovation are critical next steps.

Businesses with 'aggressive investment strategies, but low investment capacities (that limit future options)' may have overextended their commitment to innovation; and, in the process, strained the capacity of their neglected core business to support their move into new areas. To compensate, they need to rebalance their attention to new initiatives and core products in order to re-establish a positive equilibrium.

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