

More than “Moore” to win:

Optimization strategies for success in a maturing semiconductor industry

The impact of higher costs and other key disruptive trends on the semiconductor industry – especially competitive landscape changes, technology convergence and greater global connectedness – mean that traditional business models just no longer work. Nor will the promises of Moore’s Law be enough to provide sustained competitiveness. Future success will require innovative changes to existing business models that optimize capabilities in the areas of integration, customer centricity and collaboration.

Industry costs are skyrocketing. The total R&D cost for the semiconductor industry was reported to be US\$45 billion in 2006, and analysts believe that it will be US\$100 billion by 2010.¹ In addition, process development costs for 32nm manufacturing could hit US\$3 billion, which is twice the cost for 65nm process technologies.² This does not include other development costs such as new chip fabrication facilities (“fabs”), new processes, tools and equipment.

Market indicators show the industry is, in fact, maturing. Revenue growth has slowed dramatically in the past two decades (see Figure 1). The five-year compound annual growth rate (CAGR) for industry revenue dropped from more than 15 percent in 1990 to less than 4 percent by 2005.

And yet, in today’s world of pervasive computing, it seems chips can be embedded practically everywhere. It used to be that Moore’s Law – a 1965 prediction

FIGURE 1.
Five-year CAGR of semiconductor industry revenue, 1985 to 2005.



Source: IBM Institute for Business Value analysis of Semiconductor Industry Association/SICAS data. <https://www.sia-online.org/downloads/shares.pdf>.

by Gordon Moore that the number of transistors on a chip would double every one to two years – offered strong hope of lower costs and continued prosperity for chip makers.³ But today’s hard truth is that it now takes more than “Moore” to win. To better understand current industry trends and their impacts, as well as how to win in this new environment, IBM conducted the

2007 Semiconductor Industry Optimization Study (SOS). This in-depth study of the top 60 semiconductor suppliers, which include companies that manufacture their own chips (Integrated Device Makers or “IDM”) and companies that design but do not manufacture chips (fabless) and four top foundry players, is based on face-to-face interviews, analysis of financial results and industry best practices, along with other secondary research.

Our research and discussions with industry leaders led us to the conclusion that the maturing industry means companies must re-examine their business strategies and specifically, their business models. Indeed, companies should not only look for a new “super application” or cutting-edge technology to achieve the next level of growth, but they also need to determine what changes are needed to help them improve their financial returns in an industry facing significant disruption.

The seven Cs: Disruptive industry trends

Seven disruptive trends – we call them the “seven Cs” – are reshaping industry players, their relationships within the ecosystem, and the value chain itself. These forces include complexity, commoditization, consumerization, along with four others that we examine more closely in our full paper:



- **Cost:** Doing business is more expensive across the board.
- **Competition:** The industry is in flux.
- **Convergence:** Semiconductors are the common “fabric” binding digital content.
- **Connectedness:** A flatter world is bringing people closer.

Optimization strategies

With the seven Cs and so much resulting industry volatility, the proven strategies of the past may bring failures in the future. As companies navigate in today’s rapidly changing global business environment, their ability to shift direction and introduce business model innovation is proving to be a critical success factor. These approaches to business model innovation can either be used alone or in combination.

1. **Industry model** – Innovation in the “industry value chain.”
2. **Enterprise model** – Innovation in the structure of the enterprise and the role it plays in new or existing value chains, focusing on redefining organizational boundaries.

3. **Revenue model** – Innovation in how companies generate revenues by reconfiguring offerings (product/service/ value mix) and by introducing new pricing models.

Choosing the right course of business model innovation is only one part of the equation. A key set of business capabilities must also be developed, including:

- **Centricity:** Strengthen connections with both customers and end customers.
- **Collaboration:** Aim for radical collaboration by thinking and acting “big.”
- **Integration:** Tighten ecosystem integration to bring differentiated value to the end customer.

When it comes to semiconductors, the race for “smaller, faster and cheaper” is still on, but the traditional focus on product and technology innovation alone is not sufficient to survive the seven Cs – especially skyrocketing costs, dynamic competition, digital convergence and greater global connectedness.

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- **Component Business Modeling (CBM) tools and Service-Oriented Architecture (SOA):** Help with selecting where to focus your organization and building flexible IT infrastructures
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