Fabless

The Transformation of the Semiconductor Industry
FABLESS

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Preface

The purpose of this book is to illustrate the magnificence of the fabless semiconductor ecosystem, and to give credit where credit is due.

We trace the history of the semiconductor industry from both a technical and business perspective. We argue that the development of the fabless business model was a key enabler of the growth in semiconductors since the mid-1980s. Because business models, as much as the technology, are what keep us thrilled with new gadgets year after year, we focus on the evolution of the electronics business.

We also invited key players in the industry to contribute chapters. These “In Their Own Words” chapters allow the heavyweights of the industry to tell their corporate history for themselves, focusing on the industry developments (both in technology and business models) that made them successful, and how they in turn drive the further evolution of the semiconductor industry.

The economics of designing a chip and getting it manufactured is similar to how the pharmaceutical industry gets a new drug to market. Getting to the stage that a drug can be shipped to your local pharmacy is enormously expensive. But once it’s done, you have something that can be manufactured for a few cents and sold for, perhaps, ten dollars. ICs are like that, although for different reasons. Getting an IC designed and manufactured is incredibly expensive, but then you have something
that can be manufactured for a few dollars, and put into products that can be sold for hundreds of dollars. One way to look at it is that the first IC costs many millions of dollars—you only make a lot of money if you sell a lot of them.

What we hope you learn from this book is that even though IC-based electronics are cheap and ubiquitous, they are not cheap or easy to make. It takes teams of hundreds of design engineers to design an IC, and a complex ecosystem of software, components, and services to make it happen. The fabs that physically manufacture the ICs cost more to build than a nuclear power plant. Yet year after year, for 40 years, the cost per transistor has decreased in a steady and predictable curve. There are many reasons for this cost reduction, and we argue that the fabless semiconductor business model is among the most important of those reasons over the past three decades.

The next chapter is an introduction to the history of the semiconductor industry, including the invention of the basic building block of all modern digital devices, the transistor, the invention of the integrated circuit, and the businesses that developed around them.