



1984 All Over Again

COMPARING THE GLOBAL COMPUTER MARKET OF THE 1980s WITH THE GLOBAL SEMICONDUCTOR MARKET OF TODAY

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In 1984 the global computer market had reached a crossroads. As the need for computing power had skyrocketed, so had the cost. Mainframes had grown larger but the pool of suppliers had shrunk. Visionaries realized that the cost-effective response was to move in the opposite direction. The Personal Computer was born.

A quarter century later, a similar situation is developing in the semiconductor industry. Costs for the “mainframe” of the industry—the fabricator—have soared 5,000% over the last 30 years. Today small-volume activities are virtually unaffordable. The supplier pool shrinks as infrastructure costs climb. In 2012 the global semiconductor market has reached a crossroads, and suddenly it’s 1984 all over again.

1978-85: In the early 1980s the Mainframe segment largely dominated the computer industry. In addition to equipment costs, operating the mainframe required expensive utilities and customized facilities. Some machines, for example, required liquid nitrogen cooling for the processors. The cost was measured against performance metrics like Floating Point Operations Per Second (FLOPS), and for applications that demanded significant FLOPS, the mainframe delivered tremendous value.

As infrastructure costs grew, access to computing resources shrank. Since the cost of developing competitive systems was out of reach to all but the largest companies, the market for mainframe components consolidated to just a few major suppliers. The cost of resources even hampered software developers. At the time, few could envision a single-user computing device free of these inherent impediments.



Typical mainframe circa 1980s

Fortunately, innovations in the mainframe space finally yielded technology that could be applied to single-user devices. While not competitive in FLOPS, these devices traded power for price point. And, the Personal Computer age burst into our offices and our homes.

2012: The semiconductor industry has seen remarkable growth in the last 3 decades. Today, design and fabrication of semiconductor devices generates \$250 billion worldwide and contributes to \$1.2 trillion in electronic systems and \$5 trillion in services. That’s close to 10% of the world’s GDP.

Like the mainframe industry, semiconductors have seen huge, steady improvements in the price/power ratio. And just like 1984, it’s the massive improvements themselves that may wind up throttling innovation unless somebody takes bold action.

In 1980, a state-of-the-art fabrication plant, or ‘fab’, cost about \$100 million. Electronics companies commonly owned fabs so they could conduct their own R&D and develop proprietary process flows.

But with costs topping \$5 billion (and projection of next-generation prices over \$20 billion), it’s virtually impossible to conduct the kind of small-scale fabrication that fuels innovation.

The similarities between the computer industry of the early 1980s and the semiconductor industry of today are obvious—as are the opportunities they both afford.

Innovators with a novel solution are once again needed to give birth to a revolution.

It’s 1984 all over again.



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