

**Rich Karlgaard** Forbes Staff*I celebrate innovation and growth.*

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# A Bold Look At Moore's Law

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“**CRAMMING MORE** Components Onto Integrated Circuits” is not a sexy headline. As click bait goes, it’s awful. But this was the title of [Gordon Moore’s](#) article, published in the Apr. 19, 1965 issue of Electronics magazine –50 years ago next month–that introduced the world to a singular, shape-changing idea that would later become known as Moore’s Law.

Moore begins his article thus: “The future of integrated electronics is the future of electronics itself. The advantages of integration will bring about a proliferation of electronics, pushing this science into many new areas. Integrated circuits will lead to such wonders as home computers–or at least terminals connected to a central computer–automatic controls for automobiles, and personal portable communications equipment. The electronic wristwatch needs only a display to be feasible today.”

The point Moore was making was that electronic chips, invented just a few years before, were improving at a dizzying speed. He tried to plot these price and performance points on regular graph paper, but they took off too fast, so he switched to logarithmic graph paper. He got a nice straight and shallow line. It showed that the performance of these chips was doubling every couple of years (18 months at the time, 24 now).

It was an impressive graph, but no one then–not even Moore–realized this graph would continue to hold for 50 years and set the blistering pace of change for the modern world. We all now live in the world of Moore’s Law, and we likely will for at least another quarter-century.

As writer Michael S. Malone and I note in our forthcoming book, *Team Genius: The New Science of High-Performing Organizations* (Harper[Business](#), July 2015), Moore’s curve was very shallow for the first 40 years, until about 2005. Yet along that comparatively flat curve can be found the births of the minicomputer, the microprocessor, the digital calculator, computer gaming, the personal computer, the Internet, robotics, wireless telephony, the smartphone and electronic commerce.

Since 2005, as we race toward 25 billion transistors per chip, the curve has gone almost straight up, heading toward infinity. Are we really prepared for this? If the entire digital age occurred in the foothills, what's going to happen now that we're entering the Himalayas?

We've grown so accustomed to living in the world of Moore's Law that we forget we're dealing with one of the most explosive forces in history. We've become so adept at predicting, incorporating and assimilating each new, upward tick of the curve that we assume we have this monster under control. We don't.

## **TIPPING POINT'S A-COMING**

That hasn't kept writers and futurists from speculating on what Moore's Law will bring. Such books as Alvin Toffler's *Future Shock* (1970) and *The Third Wave* (1980) were early attempts that hold up remarkably well today. George Gilder's *Microcosm* (1989) and *Telecosm* (2000) predicted the mobile revolution.

Now comes *Bold: How to Go Big, Create Wealth and Impact the World* by Peter H. Diamandis and Steven Kotler (Simon & Schuster). Let me say up front that I loved *Bold* and don't hesitate to put it alongside *Future Shock* and *Telecosm*. It's that good.

Critics have jumped on *Bold* as techno-utopian. Maybe that's so, because *Bold* is a joy to read and, indeed, lifts your spirits. More substantively, *Bold* will give you a framework for assessing the Moore's Law technologies—the authors call them “exponential technologies”—that drive the economy. Diamandis and Kotler see billion-dollar opportunities behind the world's toughest problems—aging, disease, poverty and so on.

If you're an entrepreneur, read *Bold* for opportunity. If you're a manager, read it to recognize disruptive threats. If you're an investor, read it to question your assumptions. For example, you think 3-D printing, driverless cars and cheap cures for cancer are overhyped? The tipping point's a-coming, and *Bold's* daring authors show you how to recognize it:

“Recognizing when a technology is exiting the trough of [overhype and] disillusionment and beginning to rise up the slope of enlightenment is critical for entrepreneurs,” writes Diamandis. “For me, the most important telltale factor is the development of a simple and elegant user interface—a gateway of effortless interaction that plucks a technology from the hands of the geeks and deposits it with entrepreneurs.”

**Rich Karlgaard is the publisher at Forbes. His latest book, *The Soft Edge: Where Great Companies Find Lasting Success*, came out in April. For his past columns and blogs visit our website at [www.forbes.com/karlgaard](http://www.forbes.com/karlgaard).**

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