Stanford eCorner

Ray Kurzweil's Optimistic Prognosis for Technology

Steve Jurvetson, *Draper Fisher Jurvetson*

October 07, 2009

Video URL: http://ecorner.stanford.edu/videos/2298/Ray-Kurzweils-Optimistic-Prognosis-for-Technology

Steve Jurvetson, the partner and moniker behind VC firm DFJ, discusses in detail Ray Kurzweil's take on Moore's Law, which retroactively looks at the evolution of technology and the economy in terms of the numbers of possible calculations possible for a thousand dollars for the past hundred years. Of interest to the entrepreneur, Jurvetson points out that of global, social, and economic factors over time, there seems to be no coupling with the evolution of technology. Despite a poor economy, recessionary concerns, wars and political unrest, cites Jurvetson, technology continues to evolve at a steady and unstoppable pace.

Transcript

Changing it even more is one of my favorite people, Gordon Moore, at least the eponymous law that is ascribed to him. He likes to go salmon fishing in Half Moon Bay. So, here's a photo I took of him. In fact, I think all the photos in here are ones I've taken. Just an aside, I love photography as a hobby. And he's a wonderful guy and he came up with something called Moore's Law. Now, I want to ask how many people have seen Ray Kurzweil's version of Moore's Law, which is an abstraction of Moore's Law that goes back over 100 years? Come on! Only two hands? Three? Wow, it's actually one of the lowest response rates of any audience I've seen. I don't understand what that means. Usually our investors like our OPs, they don't read this kind of stuff but anyway. I think it's the most important graph of all technology business in all of history of technology business.

And what it's showing is to explain in a logarithmic scale. So, a straight line on this would be the exponential pace of growth that is slightly upticking that Kurzweil argues is a double exponential. We're looking not at how many transistors are on a chip but how many calculations per second you can buy for $1000 because nobody buys transistors, right? Intel may care about transistor count. Moore is the co-founder of Intel, he certainly cared about it. But people buy computation and storage. In either way you graph it, you get this remarkable curve that transcends any one technology. So, these sort of colored bands are integrated circuits, discrete components, vacuum tubes, relays, mechanical devices. The dots are the sort of price performance leaders of their day. So, there may be other companies that fill or products that fill the graph below it. These are the frontier of human computational capacity.

It says a lot of interesting things. First, what does that mean? There are deep cosmological questions and all kinds of evolutionary arguments one can make about how we use our technology, develop our tools and so and so forth and where might this head, by the way, if it goes from just another 25 or 50 years and $1000 buys you more computational power than all human brains on earth combined. You'll reach some kind of staggering points if this continues. It also begs the question of what the next technology platform would be, molecular electronics or nanotech or spintronics. Computing beyond the integrated circuit doesn't have to be CMOS silicon, as we've known it. Something new may take over. But most importantly of all, at least from the source of optimism and interest, is that there seems to be absolutely no coupling to the economy. So, these companies may have come and gone. But the Great Depression, all the recessions, World War I, World War II, have had no meaningful impact on the trajectory progress of innovation technology, which is really astounding. You just really stop and

let those sink in because in the middle of this economic recession, you might think, "Oh, innovation dries up," and it doesn't.

Within university labs, it's just booming like crazy. The companies that take advantage of that may have pent-up demand and maybe more pent-up disruption to take advantage of when you finally do come out with a new product or service. But the pace of human innovation, I believe, continues unabated and is exogenous to the economy. Pretty cool.