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NEWSMAKER Q&A: TECHNOLOGY

"Everyone Wants to Be a VC..."

...And that's a shame, says AT&T Bell Labs ex-honcho Greg Blonder, who urges entrepreneurs to forsake quick profits for long-term gains

Remember the 1980s? Japan's electronics giants were hammering their U.S. rivals in both consumer and industrial markets. Headlines dripped woe and worry. Then, that collective angst dissipated almost overnight when Japan's economy stalled, paving the way for the tech boom of the '90s in the U.S.

It has been that long since U.S. technological leadership was threatened seriously. Now, there's reason to worry again, according to Greg Blonder. His concern can't be dismissed lightly. Blonder is intimately familiar with both sides of the R&D equation. From 1982 to 1998, he was a star researcher and manager at AT&T Bell Laboratories (before AT&T's breakup) and holds more than 70 patents. Today, he's a

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venture capitalist with Morgenthaler Ventures.

Blonder warns that a new innovation crisis is brewing. It flowered in the perverse economics of the dot-com era, when a flood of Internet capital tilted priorities away from long-term research toward get-rich-quick development. The result, Blonder says, is that for a decade we've been planting too little "seed corn" -- the basic scientific discoveries that can take 20 years or more to commercialize. And he sees new technological challenges from China and India.

BusinessWeek Senior Writer Otis Port recently caught up with Blonder at an outdoor café in New York's Rockefeller Center. Edited excerpts of their conversation follow:

Q: The dot-com bubble spawned lots of innovative startups, as well as instant millionaires. What's wrong with that?
A: It fostered a gold-rush mentality that sucked a lot of good scientists and engineers out of school before they finished their degrees. Even a lot of professors went off to start companies. It created a climate that was negative toward long-term thinking and work on long-range problems.

I don't think we realize how broken we are. And when we wake up, when the next crisis hits, it will be way too late. Innovations are built on basic research that was done long ago -- 15 or 20 years ago for electronics and communications, and 20 to 30 years earlier for new materials.

Q: America's innovation engine is broken?
A: To be blunt, yes -- in the sense that we've eaten our seed corn. Long-term research needs steady hands, steady financing, over very long periods of time.

There are basically only three places that gestate long-term research: monopolies like AT&T, universities, and the government. We've basically eliminated the traditional monopolies, and large companies have been forced out of supporting long-term R&D -- except for a very few places, like IBM. Industry is also farming out more short-term research to universities, so the good professors who didn't get sucked out by the dot-com bubble are doing less long-term research.

Meanwhile, government support has run hot and cold, not steady. Support for long-term research varies with each Administration. Funding from the [Defense Advanced Research Projects Agency] has been steady -- but just for short periods. Basically, DARPA is like the government's seed venture capitalist.

So everyone has started playing the same short-term game. Everyone wants to be a VC -- invest for a few years, then cash out.

Q: So why did you move from research to VC?
A: AT&T did research right. But it failed at commercializing ideas. I found that distressing, so I moved to venture capital because it brings

ideas to market quickly and efficiently.

But as a nation we can't all be VCs. We need to support universities. We have to provide economic incentives for large organizations to invest in long-term futures. And make sure the rewards, like patents, are there. There are so few incentives for long-term thinking, long-term research, long-term investment. [Patents] are one of the very few, and I don't like the direction that current policies in Washington seem to be heading.

Q: Does that mean you think we need to make changes to the patent system?
A: Yes. The first problem has to do with the term of patents, which is now 20 years. That's too long -- and too short. Thomas Jefferson's theory was that patents ought to be granted a monopoly only for one generation, so one generation can't hold the next hostage.

In high tech, one could argue that a generation is no more than five years. With a 20-year patent, you end up holding the entire industry hostage for four or five generations. But in fields such as materials or life sciences, 20 years can be too short. So we should adjust the life span of patents to reflect economic and business realities, in the same way that we vary depreciation schedules.

Q: Anything else?
A: Patents are issued much too readily, for really trivial ideas. The patent system already has a perfectly fine standard: It says patents are given for ideas not obvious to those skilled in the art. If you gather a group of scientists and ask them to dream up some inventions, whatever they come up with, off the tops of their heads, is obvious and ought not to be patentable.

I did this experiment a half-dozen times at Bell Labs. Each group of scientists inevitably thought of TiVo before it existed -- and Napster. Such ideas just don't deserve patent protection. Patents should be reserved for the few critical inventions -- and these occur rarely.

Q: How else can we encourage long-term research?
A: This is a strange time to make this claim, but I think we ought to open the floodgates to immigration and encourage scientists and engineers to come to the U.S.

The public is worried about the threat of foreign terrorists. But my experience has been that immigrants are the most adamantly patriotic people you'll find. New immigrants have a visceral appreciation for the U.S. They know what they've gained by coming here. It's the Tim McVeighs who are willing to squander what their ancestors gained over generations.

Q: Where do you see the next round of competition coming from -- China?
A: China will certainly present us with an even bigger challenge than

Japan. They're obviously a brilliant group of people, and they're disproportionately interested in doing engineering and science -- much more so than we are. Last year, Asia passed the U.S. in total number of PhDs. They're very entrepreneurial as well, whereas the Japanese are not.

There's also India. India is interesting because, moreso than China, it's homogeneous in terms of value systems and skill sets. And again, they have a deeper penchant for technical careers than we do, plus all the same desires to build businesses. Look at the number of successful Indian entrepreneurs here. It's astonishing how successful they've been.

Q: So where does the U.S. look for competitive advantage in the future?
A: These days, most of the low-hanging fruit has been harvested -- inventions that draw upon only one technical discipline. The important new inventions, today and tomorrow, draw on many disciplines, especially computational science, biotech, chemistry, physics, and materials science. So if you don't have an environment where these are present, you're never going to come up with major inventions.

For any other country to match our cultural and technical diversity would be very difficult. That would take a massive reworking of society. So let's make the most of what we have.

Q: You mentioned computational science. Can we exploit the power of new systems -- new computer models and simulations -- to reduce the innovation cycle?
A: Yes and no. So far, there's no evidence that the time it takes for basic research to work its way into products is shrinking. The innovations making news today still stem from research that was done 15, 20, or 30 years ago.

Where simulations will make a big differences is in engineering and manufacturing. And services, like better weather forecasting and airline scheduling: Get a plane across the country a bit faster, avoiding storms, and the entire innovation cycle is sped up. In engineering, simulations of silicon-circuit designs and semiconductor processing are part of the reason we're still following the Moore's Law curve, doubling performance or halving costs every 18 months.

So here's my prediction: Newer tools will cut these cycles by 50% to 90%. [For example,] simulations may not lead to entirely new classes of drugs very often, but they will make custom drugs affordable to even narrow interest groups. For every one penicillin discovered, hundreds of simulated variations will be sold -- one to avoid allergic reactions, another to concentrate preferentially in the lungs, and so on. Variation is likelier than invention.

Q: Will computers get so powerful that they could do the inventing as well?

A: Computational simulation will develop into one of the great long-term trends. It's now just sending down roots, but it's going to lead to major breakthroughs. When that happens, it'll be like Arthur C. Clarke said: "Any sufficiently advanced technology is indistinguishable from magic."

It's already happening in certain areas, like using Mathcad [from MathSoft Engineering & Education Inc.] to do numerical integration and calculus. That tool constantly surprises you by finding new mathematical insights for phenomena that you never would have stumbled on otherwise.

Q: Will we eventually get to the point where we eliminate trial-and-error approaches?
A: I think so. Today, we're still struggling to innovate with very clever, very elaborate algorithms. They can provide extremely good solutions. But generally, we know they're not the ultimate best solutions. Some day soon, computational techniques will be so good that you can dispense with...good-enough answers. You'll be able to find the one best solution by trying all possibilities.

Q: That'll sure get rid of a lot of tedium.
A: It also will dramatically change the competitive situation, because you actually don't have to be very smart to find best answers. The limitation on simulations now is the cleverness of your algorithm. But when you have enough computational power to examine all possibilities, you don't need to be clever.

I've told our kids that their kids will never need to learn foreign languages, because there will be just brilliant machine translations by then. Sure, a small number of people will learn another language because to them it's fun -- just as doing math is fun for some people with technical training. But most people do math on calculators now. And in the future, most people will rely on an automatic translator. It won't know just one or two other languages. It will know them all.

So you're going to have this blending of human skills and the skills of these computational systems. And you're not even going to think twice about it someday, just like you don't think twice about picking up a calculator to enhance your math ability or using a PDA to enhance your memory.

Q: Some people might resent being so reliant on machines.
A: But a lot of these computational wins have occurred, and will occur, kind of invisibly, in the background. I forget what the estimate was, but to keep track of all credit-card transactions manually would require tens of millions of clerks. To route all phone calls manually, you'd need the entire population at switchboards.

Without electronic systems doing this work, we couldn't afford today's phone networks or credit cards. No manual or mechanical system could handle the workload. So that's where cycles win, almost without your

being aware of it -- unless you stop to think how magical it is that you can punch a few buttons and instantly talk to someone halfway around the world.

Q: But that's work most people don't want to do anyhow. What about machines helping with the actual invention process?
A: There's a company called Invention Machine Corp. [in Cambridge, Mass.] that developed a system to do that. While I was at Bell Labs, we tested it. I was very impressed. It wasn't anywhere near as good as our best scientist or engineer, but it raised the inventiveness of the average researcher. It was very good at stimulating out-of-the-box thinking, and having that kind of added creativity was extremely powerful.

However, the flip side is that the software might also wind up diminishing human ingenuity. Every researcher knows that there's no such thing as a failure in science -- there are only learning opportunities. And the fact is, you usually learn more from wrong answers. So systems that always tell you the right answer will, unfortunately, remove those learning opportunities. I fear that this will degrade human intuition.

Nevertheless, those tools are going to be very valuable. On *Star Trek*, they do it all the time. They say, "Computer, simulate what will happen if we blow up that planet," and the computer lays out the consequences. Clearly, that's very valuable in a decision-making process. That's what people want. They want the computer to be there to do the heavy lifting. But the ultimate decision still will be left to human beings. I hope.

Edited by Patricia O'Connell

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