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Viewpoint

By Greg Blonder

Imagining the Next Bill Gates

The next tidal wave of advances will be in biotech, and the person who leads the way stands to reap immense wealth

In 1969, Paul Baran, one of the original architects of the Internet, made what turned out to be one of the most prescient observations of the 20th century: "Some persons (primarily computer programmers) claim the richest man in the world in the year 2000 will be a computer programmer. This may sound outlandish, but few really good programmers laugh when they consider the assertion." (P. Baran, Institute for the Future)

Baran's prediction was not at all self-evident back then. The 1960s, of course, were the heyday of mainframe computing and well before the PC or the Web browser. Yet even in those early days, a few minds were already beginning to consider the logical consequences of computer power -- consequences that would lead to, among other things, Bill Gates

becoming the richest man in the world.

The evidence was there if you knew which questions to ask. It was like watching the first oil well gushing from a Pennsylvania farm in the 1860s -- and imagining 100 million cars and the emergence of John D. Rockefeller as the richest man in America.

Today, the signs around us are just as difficult to read, but, as Yogi Berra once remarked, "You can see a lot just by looking." What will be the next half-century's all-transforming technology? And who will reap the riches to become the next Bill Gates?

SIGNS OF CHANGE. I believe the answer lays in the confluence of three heretofore largely separate trends:

- The evolution of semiconductor-manufacturing capabilities and products into nanoscale dimensions.**
- The increasing ability of biochemists to engineer genetic material at the molecular (nano) level.**
- The exponential growth of computer simulations permitting the design of clusters of atoms at the nano dimension.**

For decades, each trend evolved separately. But today, these trends have come together, amplifying each other's capabilities and forming the nucleus of what I call the 3N revolution.

SIZZLING SYNERGIES. Why these three trends? First, they are each attracting huge numbers of very smart scientists and engineers from around the world -- and one should never underestimate the potential of combined intellectual horsepower.

Second, all three trends are already beginning to overlap in highly productive ways. The gene chips from a company like Affymetrix rely on semiconductor processing in their manufacture, new materials are now made directly in the computer rather than empirically on the lab bench, and the Human Genome Project depended as much on high-speed

numerical analysis as on wet chemistry.

As the 3N revolution marches forward, its synergies will deepen, blurring the distinctions between organic and inorganic materials or between what must be observed and what can be simulated. Engineers and scientists are increasingly able to manipulate an unimaginable combination of molecules with unique electronic and biological attributes, creating a whole new generation of building blocks every bit as malleable, fungible, and extendable as 1s and 0s -- and at increasingly lower cost.

Out of this 3N convergence of technologies one can easily imagine:

- A reinvigoration of Moore's Law, resulting in ever more powerful computers -- at less cost and size.**
- A proliferation of enhanced everyday materials: flexible non-corroding concretes, solar cells with three times the efficiency and a third the cost, artificial bone that outperforms titanium, etc.**
- The outright cure of most diseases, or at least the conversion of acute diseases into chronic but manageable conditions.**
- The deliberate enhancement of our own DNA and that of our children**

BODY UPGRADES. The first two advances will probably enter society at a steadier historical pace. It's the familiar story of steel replacing bronze replacing stone, and so on. But it's the latter two advances -- disease elimination and enhancements of the human body -- that are likely to produce the massive discontinuities catapulting the next Gates or Rockefeller to the top of the economic hill.

The incentive to cure, say, Parkinson's Disease is obvious, but the new 3N technologies also contain the potential for "discretionary upgrades." With a few simple genetic alterations, you or your children could become 20% smarter or have the heart and lung capacity of Lance Armstrong.

Such possibilities raise obvious moral and ethical concerns. But at a time when many parents obsess over getting their children into "Ivy League-

track" day-care centers and plastic surgery is a common birthday present, such concerns would not likely stand in the way of the development of a substantial market.

WINNING CONFIDENCE. In the U.S., where at least 15% of GDP is spent on health care, the productivity savings alone would transform and invigorate the economy. Today, we cheer when annual GDP improves at a 3% rate. The emergence of true "silver bullet" cures and body-part replacements would make such rates very old news indeed.

In such an environment, the first precondition for the next Bill Gates would be the ability to build a brand. As soon as you start tampering with what it means to be a human being, people will demand the assurance that the experiment isn't going to backfire, and brands help people feel comfortable.

Here, a first mover advantage will be tremendously important. The first person and company using the new technologies to cure, say, Parkinson's and then take on cystic fibrosis with the same tools will build the public confidence and trust necessary for continued growth. And that person and company will have built up enough political capital to also offer the human enhancements -- both mechanical and genetic -- that go beyond mere health.

LEFT BEHIND? What's more, because the body is a complex and highly interactive machine, few people will risk modifying one set of genes with products from two companies. Who knows if they will play nice together? Again, all the conditions are in place for a few large companies to dominate the industry -- or perhaps just one.

Will the next Bill Gates be an American? My guess is probably not. Religious pressures and fear of change, already evident in the embryonic stem-cell debate, will probably slow down U.S. research efforts -- just as other countries, such as South Korea, accelerate their efforts to capture clear-cut economic advantage. With a healthier population, they will spend less on medicine and more on developing their economy. They will work harder and smarter. We're in danger of being left behind.

Idle speculation? Perhaps. But the 3N revolution is coming at us awfully fast. And the next Bill Gates is probably already among us.

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