Panning Out

WAVES OF INVESTMENT IN NEW TECHNOLOGY ARE often likened to gold rushes in their cycles of boundless enthusiasm, frenzied activity—and disappointment for the vast majority of people for whom things don't quite pan out. Entrepreneurs bear the most risk in that they wager years of their lives (not to mention personal savings) on individual claims, whereas investors can spread their bets around in the hope that at least one promising property will make good. Even the certainty that a budding technology will change the world is no more help in making money than the certainty that there really is gold somewhere in them thar hills. The typical hundred dollars invested in Internet startups in 2000 would barely pay for a snail-mail stamp today. Clearly, transmuting raw hope into net profits requires investors and entrepreneurs to place extremely prescient and/or damn lucky bets on those rare companies that will actually convert cutting-edge research into commercially successful products.

Or does it? Brian Lim, founder and CEO of Santa Barbara, CA-based Atomate, believes he has found a unique way of capitalizing on the latest gold rush, nanotechnology. Rather than attempting to develop specific nanotech products, such as nanowires or nanomachines, Lim and his colleagues are selling fabrication systems to other nanotech researchers. "We're selling the pans to the prospectors," he says—not trying to do the prospecting.

Atomate's "pans" are a bit more sophisticated than those of yore. Fabricating nanotech devices is intrinsically difficult and requires specialized machinery. "Nanotech researchers have been purchasing equipment designed to fabricate microchips on silicon and then customizing it for nanotechnology," Lim explains. He and his team, which includes several experienced nanotechnologists, realized that they could provide a tremendous boost to researchers, many of whom operate on constrained university budgets, by producing equipment that's already adapted for the nano world.

SCORECARD: ATOMATE

ELEVATOR PITCH	Fabrication technology for nanotechnologists
FUTURE VISION	Atomate's systems will power mainstream nanotech production
CEO'S INSOMNIA	Nanotech won't make it out of the laboratory
LEG UP	Strong industry experience coupled with in-demand products

According to Lim, a researcher might spend $100,000 or more on a silicon fabrication machine and then invest another $50,000, plus several valuable months, modifying it before he or she could carry out any nanotech experiments. Instead, the researcher can purchase a ready-built system from Atomate and be up and running much more quickly for "about the price of a Volvo."

Of course, the rapid evolution of nanotechnology requires the continual development and adaptation of fabrication systems as new processes are created, but Lim believes his products give customers a huge head start. Indeed, some customers are now coming back to Atomate with requests for specific modifications to their systems—another source of revenue for Atomate. These customers have decided that Atomate is best suited to manipulating the fabrication machinery, thus freeing their own researchers' time and attention for actual experiments.

While Lim must protect his clients' jealously guarded intellectual-property secrets, he believes that Atomate's role as the industry's "pan" provider enables him to accurately predict where nanotech is going and what fabrication machinery it will require. Like everyone in the industry, Lim awaits the breakthrough that will move nanotech from the research lab to the factory. When it appears, he plans to shift Atomate's focus from low-cost research systems to full-scale factory fabricators.

Toward that end, Lim has been patenting fabrication techniques and processes he believes are critical to the future large-scale manufacturing of nanotech products and is weighing plans for expanding the company. Lim founded Atomate just 18 months ago with an angel investment of about $1 million; nonetheless, he says it is close to breaking even and doesn't necessarily need further investment. Still, he would love to hire more researchers to continue to develop and patent techniques.

Whether to grow organically and profitably as revenues increase from the existing customer base or bring in additional investment and ramp up operations (unprofitably) in anticipation of a major industry breakthrough is a critical decision for Lim and his team. Organic growth is the safe but slow path—one that may allow competitors to leap past Atomate.

Oddly enough, a load of new investment can *raise* the risk of failure. Cash in the bank guarantees short-term survival, but the corresponding increase in expenses creates a widening hole that can only be filled by an increase in revenue. Startups survive on a diet of optimism and improving prospects, with key employees accepting pay cuts in exchange for stock options and hope. Once new people are hired, salaries raised, and office space occupied, it's hard to scale back without disillusioning employees and investors alike.

Of course, the road to success rarely rises straight up, and everyone has to be prepared, at least mentally, for things not to go precisely as planned. In technology startups, as in any form of prospecting, it's good to be good, better to be lucky, but best to be both.

Joe Chung cofounded Cambridge, MA-based Art Technology Group. Neither he nor *TR* holds any financial interest in the companies profiled nor endorses them as investments. To share your company's story with Joe, e-mail joe.chung@technologyreview.com.