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Beyond Nano-Tex: Portrait of a "Parallel Entrepreneur"

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There's nothing more exhilarating than to experience what was once just a vision in your mind becoming a real product with real customers and generating real revenues. To realize that the livelihoods of employees and their families depend on your success is at once exciting…and scary.

That's why I'm always in awe of successful serial entrepreneurs. These are the guys who get such a buzz out of doing it once that they do it over and over again. Folks like Philippe Kahn. He started Borland in 1982, Starfish Software in 1994, LightSurf in 1998, and Fullpower in 2003. While Fullpower is still in stealth mode, the first three have either gone public or been acquired. And then there's Larry Bock, founder and Chairman of Nanosys. Bock founded or co-founded 13 companies before Nanosys.

One successful start-up after another. These guys are truly admirable. But perhaps the most amazing entrepreneurs of them all are not the serial entrepreneurs, but the successful serial *parallel* entrepreneurs—the ones who work on not one, but several start-ups simultaneously, over and over again.

Dr. David S. Soane

Parallel entrepreneurship flies in the face of conventional VC thinking. As investors, we like to see focus. How can an entrepreneur make a start-up—which is likely to encounter many unforeseen challenges—succeed if he is constantly shifting his attention from one company to another? I wanted to find that answer.

Enter David Soane. I first met Soane three years ago at IBF's Nanotechnology Investing Forum in Palm Springs, a conference I highly recommend if you're interested in the latest nanotech trends and start-ups. At that time, Soane was founder and Chief Scientific Officer of Nano-Tex, arguably the poster child company for nanotechnology, which represents a huge market, proprietary technology, real products, and real customers. There he was in front of several hundred venture and corporate investors, pouring liquid all over a pair of Eddie Bauer "Nano-Care" khaki pants. He wanted to demonstrate that 10-100 nanometer "whiskers" attached to cotton fibers modified the surface tension so much that almost nothing could soak into and stain the pants. Red wine, soy sauce, chocolate syrup—I've ruined plenty of good ties and slacks in my time, so like others in the audience, I bought a pair of these khakis as soon as I got home.

At first glance, Soane, 53, is an unlikely entrepreneur. Most of the entrepreneurs I've met are outspoken salespeople. They have an infectious vision that rallies support…and hopefully investment. In contrast, Soane is modest and understated. He comes across as a mild-mannered scientist and professor – which he once was. Imagine my surprise then, when I discovered that he is not only a serial entrepreneur, but a serial parallel entrepreneur. Soane has founded eight different start-ups, *in groups of two or three at a time*. Indeed, although he is currently working on three different companies, he has a pipeline of ideas for even more start-ups.

Soane wasn't always an entrepreneur. He was born and raised in Taiwan and entered the Ph.D. program in Chemical Engineering at the University of California at Berkeley. His professors considered him such a good scientist that they convinced him to stay and become a professor in 1979. He developed a large and diverse research group with close to 20 post-docs and graduate students working on polymer chemistry and engineering technologies in photoresists, capillary electrophoresis, and membrane preparation. Over the years he has published approximately 200 technical papers and two books, and has been associated with over 100 patents and applications. Soane divides his entrepreneurial experience into three distinct phases, which I'll discuss in the following pages.

During a sabbatical in 1991 and subsequent leave of absence in 1992-93, Soane started Soane Technologies, to consult on advanced polymer chemistry and the precision engineering of polymer materials. A second child was on the way, and this would help make ends meet. His wife, Zoya, who had some entrepreneurial experience with Trilogy, encouraged him to test his own entrepreneurial skill. He developed and received patents for distinct technologies that formed the basis of his first two parallel start-ups—in optical lens casting and electrophoresis. The first technology enabled rapid turnaround eyeglass production. Rather than having an outside lab grind and polish ophthalmic lenses, opticians could rapidly create lightweight, scratch- and impact-resistant lenses right in their own stores, using Soane's photo-polymerization system. His first partner was LensCrafters. Another partner, Rodenstock, acquired control of this technology in the late 90s to propel its business in North America. Soane BioSciences was created from the second technology. The company's credit card–size lab-on-a-chip used networks of microfluidic channels filled with polymer gels to separate DNA and proteins for pharmaceutical and Human Genome applications. The company evolved into publicly traded Aclara BioSciences and merged with ViroLogic in 2004.

During this period, Soane transitioned from academic thinking to business thinking. "I had enjoyed the intellectual stimulation of academia…the fundamental groundbreaking research," Soane reminisces. "As a professor, my products were refereed papers and great students. I provided a somewhat altruistic service to society. I wasn't motivated by profits. It was a great life, but sometimes out of touch with reality." As an entrepreneur, Soane learned how difficult it is to launch actual products. "I had to keep my ego in check. Unless you're on the line, you don't really appreciate how much work it is and how much teamwork counts. A lot of blood, sweat and tears." While Soane enjoyed working with his graduate students and appreciated the intellectual freedom of academia, he felt that his start-ups really needed him. He went back to Berkeley in 1994 only part-time and later resigned from his tenured position to become an Adjunct Professor.

With a desire to start more companies, Soane left Soane Technologies and Soane BioSciences in 1997. By then, he was bursting with ideas, had learned a lot about start-ups, and wanted to retain more control. In rapid succession, he founded ZMS, Alnis BioSciences, and Nano-Tex—a period he calls his "entrepreneurial adolescence".

ZMS, which Soane named using his wife's initials, developed and licensed out a technology dealing with the electrical properties of polymers. Using money from an angel, friends, family, and the proceeds from the technology license, the company then developed hollow microspheres and fabrication techniques for next-generation contact lenses. That IP has been licensed to a Fortune 500 company that plans to use the technology to revamp its manufacturing base.

Between the two ZMS projects, Soane came up with an idea for nano-engineered diagnostics and therapeutics for early cancer detection and cure. He formed Alnis with funding from DARPA, NIH, Johnson & Johnson, Dow Chemical, and a small number of VCs and angels. The company's hydrogels have surface peptides that bind to cancer cells, releasing interior

payloads of therapeutic drugs. This specificity results in low drug dosage, low toxicity, and high potency.

A year after Alnis, Soane founded Nano-Tex, perhaps the best known of his companies. Nano-Tex is focused on nano-modifications of fabrics for the apparel and home furnishings industries. As three parallel start-ups were quite demanding, Soane turned over the reins at Alnis to President Steve Barry, one of his former graduate students and an early Soane Technologies engineer. He also recruited David Shand as CEO, a pharmaceutical industry executive who previously managed the development of over a dozen new drugs. In 2003, Soane found Donn Tice to drive Nano-Tex's growth. Under Tice's stewardship, the company is getting a lot of traction with over 80 textile mills utilizing its treatments in products sold by more than 100 different brands. In March, they closed a $35 million round of venture capital financing.

With ZMS's technologies licensed out and Alnis and Nano-Tex in good hands, it was now time for Soane to start some more companies. By the end of 2003, he founded three more companies: ICBM, DuraFizz, and Cosmetica. Soane thinks of this as his "closely held" phase. ICBM, or Innovative Construction and Building Materials, is using nanotechnology to develop lighter yet stronger structural materials. Its gypsum-polymer replacement for gypsum, a multi-billion market in the U.S., significantly improves the strength-to-weight ratio and mold resistance of drywalls. The idea for the company was hatched when Soane was introduced by a friend to an angel who wanted more soundproof drywalls for his home-building company. The builder eventually funded the company.

Soane cherishes his quiet time to develop new ideas. Early one morning, while the family was still asleep, he started thinking about a better way to carbonate beverages. If he could create a nanopowder that could provide just-in-time, long lasting carbonation when mixed with water, it could significantly impact a whole value chain, reducing the need for bottles and cans and their associated bottling plants, transportation, shelf space, and recycling. The result was DuraFizz. Funded by the same ICBM archangel, the company is developing a controlled-release, nano-encapsulated bicarbonate core for the food and beverage industry. Soane is unusually silent on another blockbuster product he envisions for the company, but hints that nanoencapsulation has many applications in the food industry, particularly with "bad tasting but good for you" ingredients.

Cosmetica, which has plans to develop a series of personal care products using nanotechnology, is financed primarily by Soane himself. One such product uses a new approach to hair coloring that is so potentially safe and easy to use that the color can be changed at will—every day if desired. While I personally don't appreciate the value of that, more than one woman I've mentioned this to raves about how great such a product would be.

How long before we see products from Soane's current batch of start-ups on the market? He replies only that his experience tells him that "from concept to product launch in the materials science space typically takes three years of concentrated effort." In addition, he's realized that "even with a very conservative business plan, each project generally ends up taking twice as long (and costing twice as much) to accomplish...with many twists and turns between conception and launch."

Every entrepreneur will tell you that founding a start-up is stressful—long hours, lots of bumps in the road, people challenges, and cash flow problems. Why then the urge to work on parallel start-ups? "I have ideas that can impact so many different industries. If I don't act on them, they'll become stale," says Soane. And how can one make it practically feasible? Soane describes three key ingredients.

Make sure you have expertise in an area of broad impact. "Polymers are probably the most ubiquitous synthetic materials made in huge quantities," Soane proudly explains, as if he wrote *The Graduate*. "There are hundreds of industries where macromolecular science can give you a huge edge." Indeed, Soane seems to have a knack for identifying mature industries with mass markets that are ready for the infusion of benefits that his polymer expertise can bring. As venture capitalist Vinod Khosla of Kleiner Perkins Caufield & Byers observes, "Innovation can happen in surprising places. David Soane has been able to apply imagination, ingenuity, and bleeding edge nanoscience to unexpected applications from Gap khaki's to hair dyes to gypsum boards for your walls. These seemingly large, traditional non-techie markets are being revolutionized by his scientific insights." But Soane knows his limitations. "It would

be difficult for me to start a company that doesn't involve polymer chemistry. I wouldn't have the domain expertise."

Don't try to run each company yourself. Soane believes that being the *technical idea guy* has its advantages, if you want to be a parallel entrepreneur. <I< i>

"Companies will invariably run into trouble, they never follow a straight line," Soane says from personal experience. "No matter how conservatively I plan, something always goes wrong, and things always take much longer than I thought. So, the hands-on technical employees and general management must be dedicated to deal with the myriad of problems that crop up. I can't overstress how important it is to have a bright, dedicated team in place responsible for the execution. Fortunately, as the technical consultant, and not CEO, I can make myself available to all my companies. Their demands for my time are sporadic—help in unclogging a research bottleneck, getting guidance on new directions, or my presence in meeting with potential partners. Furthermore, the mind is most creative when exposed to disparate industries, so working on more than one company is a good thing." Soane doesn't think he can handle more than two or three start-ups simultaneously. "There are only 24 hours in the day," he says with a laugh.

Create a lasting institution. Soane believes that at some point an entrepreneur needs to bow out gracefully and leave the company to those who know the business better. "I hope the initial culture I establish will be codified and that the institution will outlast me. I try to instill an entrepreneurial culture and spirit, a can-do attitude, an excitement around going to market and bringing value to partners and customers, and a high degree of ethics. The faster a team can become independent, the more successful one will be." A good rule of thumb? "In three to five years, the company will have outgrown its need for me." Then it's time to move on to the next set of start-ups.

In many ways, Soane's vision of how he works with start-ups is similar to that of a good early-stage venture capitalist. Instead of financial and management capital, he provides intellectual capital. Soane and VCs both work with multiple start-ups simultaneously, in areas where they have some expertise. They make themselves available where most needed, but aren't typically the hands-on guy. Perhaps the key difference is that Soane generates the ideas for each of his companies himself.

Soane is pushing hard on all three of his current companies. Yet he is already exploring what he might do in his next phase. To help generate new technical ideas, he spends lots of time in science libraries. But this time he is looking at different business models too. One area of focus comes from his experience with parallel start-ups.

Soane found that although technical employees needed to be dedicated, much of the administrative structure could be shared between his various companies—finance, human resources, and legal. Even a building could be partitioned into different labs. And there could certainly be purchasing economies.

Why not take this to the next level? Is there a structure that would allow further sharing of resources and streamlining operations? While the questions and possible approaches are intriguing to Soane, he realizes that there will undoubtedly be a number of hurdles to overcome. Meanwhile, with three parallel start-ups, he's got plenty of things to keep him busy.

While Nano-Tex may be Soane's best known company to date, I predict we'll see quite a few big success stories come out of this entrepreneur—maybe even several at once.

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